The Builder.

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Mattison-road Schools, Hornsey ..... Messrs. Arnold Mitchell and A. Butler, Joint Architects.
Memorial Library, Dulwich College ..... Mr. E. T. Hall, F.R.I.B.A., Architect.
"Norwood," Huddersfield ..... Mr. J. Hatchard Smith, F.R.I.B.A., Architect.
Competition Design for Presbyterian Church, Muswell Hill ..... By Mr. A. C. Dickie and Mr. W. Curtis Green.
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The Ancient Fortress of Otranto.

HORACE WALPOLE is credited with having written one of the first mediæval romances in a modern sense—the "Castle of Otranto: A Gothic Story"—which was printed at the famous Strawberry Hill press towards the end of the eighteenth century. This curious attempt to portray the life of the Middle Ages in a modern novel was the forerunner of the Waverley Novels and all the myriads of stories based upon that study of the old chronicles and the historical literature of mediæval Europe, which became such a very marked characteristic of the nineteenth century. The "Castle of Otranto" marks the beginning of a literary taste, as "Fonthill" in Wiltshire and "Strawberry Hill" in Middlesex are reckoned the first beginnings of that vast revolution in European art which still influences the world.

The scene of Horace Walpole's story is laid in a "Gothic" castle of the Strawberry Hill pattern; and, although it was easier for the talented author to describe Gothic architecture than to reproduce it in visible realisation in the country home of an eighteenth-century gentleman, the castle which he describes bears very little resemblance to the real Mediæval fortress which dominates the little cathedral town obscurely situated in the far south-eastern corner of Italy—on the heel of the boot-like peninsula. There is, indeed, nothing in the novel which suggests any real knowledge of the place on the part of Walpole. It would seem as if he had selected the name on account of its obscurity, for in his days Otranto must have been a place absolutely unimportant and almost unknown.

The fact of having read the "Castle of Otranto" as a child, and the dim recollections of its "romantic" descriptions of a mediæval castle as understood in the days of "pigtails and patches," induced the present writer when passing through Brindisi on a recent occasion to make a detour through the singularly unknown and out-of-the-way district—the "Terra di Otranto;" a district so little known, although close to one of those great modern highways of the world, that the natives declared they had not seen more than two other Englishmen in Otranto within the memory of man.

Otranto, which dates back sufficiently into a dim past to have a Greek name as Hydra, is one of those miniature provincial capitals which have always a certain importance as the chief towns of ancient geographical districts. In modern days this character is merely historical and traditional, the real capital of this out-of-the-way district of Italy being Lecce, with its churches, seminary, and palaces of the eighteenth century. The transference of importance from one town to the other would appear to have taken place about the period of great revolutions associated with the reign of the Emperor Charles V. (1550), who is credited with having strengthened the fortress of Otranto, and commenced the fortification of the more modern capital.

Otranto, notwithstanding, its absolute obscurity at the present day, and its insignificant proportions as a city, has probably passed through greater vicissitudes in past history than any other town in Western Europe.

In origin a Greek city, and in its earliest days sharing the position of Brindisi as the port of communication between Italy and the East, it eventually became the chief channel through which the Norman adventurers of the dark ages passed on their way to the conquest of those Levantine principalities of Athens, Sparta, Epirus, or the Ægean Islands, the memory of which lingers even at the present day in many a picturesque ruin amongst the hills of Greece. At a later date its position on a promontory dividing the Adriatic from the Mediterranean caused it to become a frontier post between the Venetians and the Spanish-Neapolitans.

In 1480 the unfortunate little city suffered a fate which has never befallen another town of the Italian peninsula. To quote an old MS. preserved in the cathedral sacristy, "At dawn on the 28th July, the fleet of the Turks appeared before the city. The bombardment continued for fifteen days without ceasing, and no succour arriving, the city was stormed, and 800 of its inhabitants were massacred." Some accounts state that 12,000 persons perished on this occasion. Thus for the first and only time in history the most dreaded of mediæval foes obtained a foothold on the shores of Italy, which they maintained for many months. The incapable King of Naples seems to have quietly submitted to the disgrace of such a humiliating menace. The Neapolitans do not seem to have made one effort to regain Otranto.

The Turkish advance, which thus met with an easy success at its outset, was possibly intended to pave the way for a much more important invasion. But within the same year the great Sultan Mohammed II., the conqueror of Constantinople, died, and the inevitable consequences attending the death of a Sultan induced the Pasha Achmet Aga, in command of the expedition, to depart suddenly in the following March. The whole Turkish force quickly melted away, leaving the ravaged and depopulated city to be reoccupied by the Neapolitans.

Since this memorable event, Otranto has gradually settled down into its present condition of complete decay and obscurity. Its harbour, abandoned for centuries, has silted up; its few inhabitants of modern times—mere peasants—make pathways through its grass-grown streets, and here and there a house partly pulled down marks the shrinkage of the population. Hardly an attempt has been made in modern times to disturb the interesting condition of the singularly picturesque fortifications, which mainly date from the period of the Turkish invasion. Only at one point a breach of a few yards in width has been pierced in the city wall for the purposes of a modern road towards the south, the

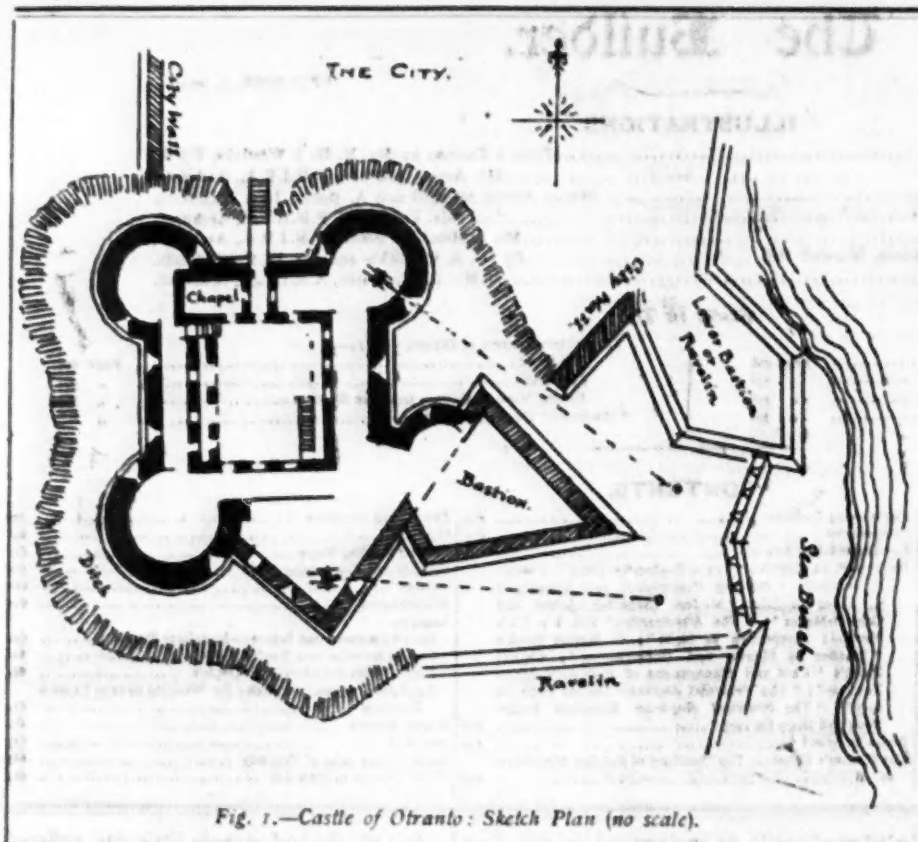


Fig. 1.—Castle of Otranto: Sketch Plan (no scale).

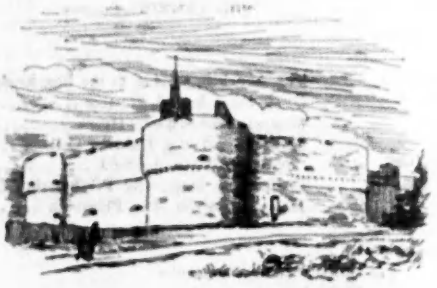


Fig. 2.—Castle of Otranto from S.W.

Fig. 5.—The Court of the Castle of Otranto.

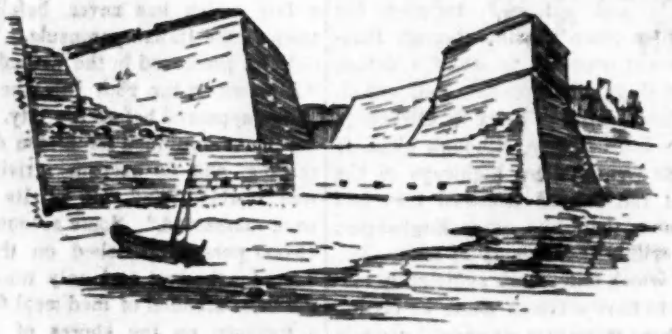


Fig. 3.—Castle of Otranto: Sea Front.

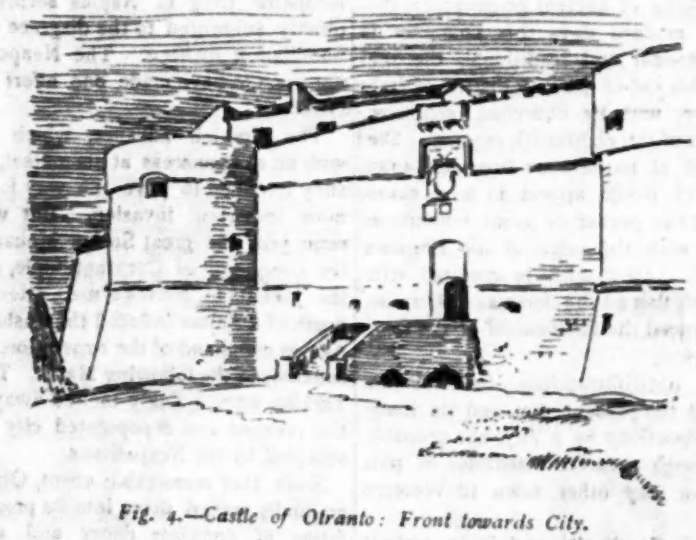


Fig. 4.—Castle of Otranto: Front towards City.

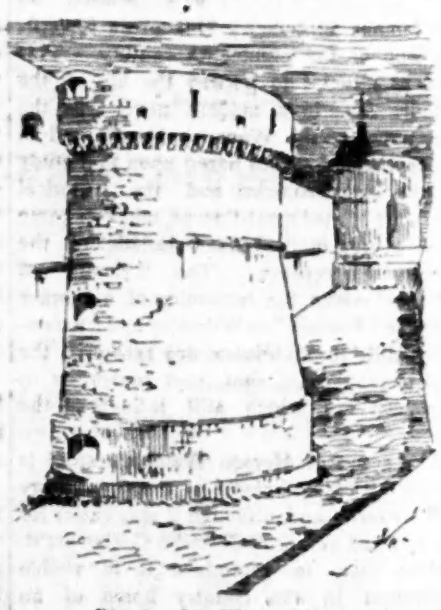


Fig. 6.—City Walls, Otranto.

only entrance within the fortified enclosure in former days being the strong gateway on the north side, which still remains intact.

Guicciardini, in his history of this period (Book XV., p. 266), states that the art of fortifying towns in the modern way, for and against the use of artillery, was learnt by the Italians from the Turks of the early sixteenth century. Many writers of about the year 1500 draw attention to the great advantages possessed by the Infidels over the Christians in all the improvements in the art of war and military architecture. The greatest spur to this development was possibly the enormous army which the Turks were able to muster on several occasions when threatening Europe. To meet these hundreds of thousands of invaders the comparatively small forces of mediæval feudalism would have been powerless. Warfare had to be planned on a grander scale, and the particular splendour and importance of the career of the Emperor Charles V. are due to his leading the first great European armies against the dreaded Mohammedans.

As a consequence of this change in warfare, we naturally find the first developments of military architecture in the borderland separating Christendom from Mohammedanism. The varying frontier between the Turkish Empire and the Venetian Republic—the battle-ground and borderland for centuries between the two faiths—is literally studded with fortresses which are invariably on a scale and of an architectural importance unknown in Western Europe at that period. Their picturesque outlines, harmonising with the romantic scenery of Greece or Dalmatia, delight the artist rambling over the former territories of the Serene Republic; and they attract serious attention as much from an

Fig. 7.—Distant View of Otranto from the North.

architectural as from a merely historical or military point of view; they are, in fact, works of monumental art.

As has been pointed out, to the Turks belongs the credit of inventing modern warfare with its enormous armies, but to the Italian genius for building is due the remarkable and often beautiful style of architectural fortress which succeeded to the picturesque castle of the Middle Ages.

The castle of Otranto—although but a small example—affords an interesting illustration of this transition stage in military architecture. The plan (fig. 1) shows that the older portion of the building consists of a square enclosure which originally had four circular towers at the angles. This portion dates from a period before the Turkish invasion. After that event—probably at the commencement of the sixteenth century—the walls of this portion were raised to the height of another story, and the great bastion of singularly acute form was added in place of the south-east tower on the seaward side. The sharp outlines of this bastion with its glacis have a singular effect seen from the sea shore (fig. 3), and contrast oddly with the view of the land side of the castle with its fifteenth-century walls and round towers (figs. 4 and 6).

The great bastion of Otranto belongs evidently to the earliest type and to a system by which the sides of a bastion were intended to be flanked by the fire from guns upon the curtain wall. This system was the reverse of that in general use at an earlier and a later period. At Otranto we may perhaps see an example of early efforts at a system of enfilading fire which was brought to perfection about the year 1520 by Michele Sammichele, the famous architect of the walls of Verona and the fortifications of Venice.

The little fortress of Otranto, which has passed through so many changes of ownership during the past 500 years, is still marvellously preserved. Its Spanish governor of the seventeenth century, whose monument decorates the castle chapel (now a hay store) would find little changed if he could revisit his ancient home, except the substitution of a stone arch for the drawbridge and the absence of all armament—the cannon have long since been melted down for other uses. The castle is now used partly as a coastguard station and partly as a country police station; but its chief claim for careful preservation in modern days is as a monument of the most stirring period of European history. Fortunately the Italian Government is well disposed towards the preservation of such monuments.

A curious souvenir of the Turkish invasion remains in the form of immense quantities of stone cannon-balls lying about the town; their superfluity even decorates the little railway station. These balls were made by galley slaves when the galleys were laid up during the winter.

THE BURIAL-GROUNDS AT CHRIST HOSPITAL, LONDON.

"HERE lyes a Benefactor, Let no one Move his Bones." So runs the inscription on a marble tablet which was set up, with several others, against the outer wall of the South Cloister, a playground called "Giffs" or "Jiffs" by the boys of Christ Hospital. The passage lies at a level lower than that of the adjacent courts, and was lighted by six of the seven pointed arches, latterly shorn of their mouldings and filled partly with brickwork, which, together with the buttresses, formed the only remains existing above ground of the Franciscan convent of Grey Friars. The tablet commemorates, it is believed, James St. Amand (or Arnaud), who died in 1749. The admonition has proved, however, to be of no avail. The Council of Almoners notify their intention to remove in the course of next January all human remains from within the Hospital precincts for re-interment in some consecrated burial-ground. That operation will not be confined to the South Cloister. For a Parliamentary Return of 1834 upon the burials in the precincts until the previous year and a Report made by the Charity Commissioners show that before 1740 a vault in the north-western corner of the cloister quadrangle—known as "the Garden"—was commonly used for the burial of children on the foundation, and that, after the closing of that vault, another one in the north-eastern corner was made for that purpose. Less than forty years ago the interment of an officer of the staff took place in the vault. In his history of the Hospital, the Rev. W. Trollope records (1834) the burial in rows of children on the south side of the cloister. It is the case, moreover, that the great Hall, covering the site, in part, of the Friars' guest-hall, and opened in 1829, stands over what is considered to be a consecrated burial-ground. An Order in Council, promulgated in 1886, forbade the continuance of sepulture within the confines of Christ Hospital. The Disused Burial Grounds Act of 1884 applies to any such ground in the Metropolis in respect whereof an Order in Council has been made for the discontinuance of burials therein, in pursuance of the Acts 15-6 Vict., c. 85, and 16-7 Vict., c. 134, but its provisions are inoperative if the ground has been sold or disposed of under the authority of any Act of Parliament. Under the Act of last year the Governors of St. Bartholomew's acquired 67,680 ft. superficial, or about three-tenths of the whole area of, say, five acres, in consideration of a sum of 238,781*l.*, payable to the Almoners, on the award of Lord Balfour of Burleigh, who was deputed to act as arbitrator.

We will now briefly advert to the additional testimony afforded by a highly-interesting set of nine hand-drawn plans which formerly belonged to the Stowe Collection, and were afterwards acquired by Frederick Crace. They consist of old copies of drawings and surveys, made in or about 1540, of the precincts of Grey Friars, the adjoining property of St. Bartholomew Hospital, and parts adjacent. Besides their extrinsic value as documentary evidence, the drawings present curious specimens of sixteenth-century cartography. One of them reminds us of the commonly forgotten fact that there was once a foot thoroughfare from the Stone Gate, on the north side of Newgate-street, nearly opposite Warwick-lane, leading along the West Cloister of Grey Friars to a postern-gate in the City Wall at the north-western corner of the cloister, and thence by "The Walke" to St. Bartholomew Hospital beyond the City Wall. The walk was closed to the public in 1818; a doorway giving access into the remoter hospital has since replaced the postern-gate in the City Wall. One drawing of the Grey Friars precincts plots two "churchyardes belonging to Christ Hospitall," at either side of the thoroughfare just beyond the Wall and at the Town Ditch—the name of the "Ditch" was perpetuated in the Bluecoat School; another "churchyarde for the poore of the Hospitale,"—that is, of St. Bartholomew—is plotted on the south-western side of the Walk. Another drawing delineates the brewhouse of St. Bartholomew's, adjoining the Stone Gate in Newgate-street, and the bakehouse and millhouse yard, the brewhouse court, and the Little Cloister in the area that afterwards became the large open ground, the boys' "Hall-play," as seen through the railings from Newgate-street.

Above the South Cloister walk and against its outer wall was erected in 1682 the Sir Robert Clayton wing, after designs by Wren, of which the porch and gateway, facing the opening of Christ Church-passage, were recently taken down to be re-erected against the south front of the great Hall at Horsham. The outer wall of the Clayton wing was raised upon the northern wall of the long nave of the Grey Friars Church as rebuilt in 1306-27 and dedicated to St. Francis of Assisi. The building 'overlooks the graveyard, behind Newgate-street,' of Christ Church. The ground floor of that wing was used for the offices of the [architect and surveyor to the Hospital and others; the upper story formed the Latin School. To Wren is attributed also the former Hall, which was erected in 1672 over the West Cloister walk and replaced, it is conjectured, the refectory. A good view of the old Hall, with the range of cloister arches beneath it, is preserved in the Fauntleroy copy of Pennant in the Soane Museum; it was removed in 1827 for a block of wards and dormitories designed by John Shaw the elder, who died in 1832. The Northern Cloister, where had stood the Franciscans

dormitory and, over it, Richard Whittington's library measuring 129 ft. by 31 ft. and finished in 1429, gave way to an open cloister, which, as well as the new range of dormitories over the Eastern Cloister, as rebuilt in 1705, was designed by Shaw and completed by his son, John Shaw the younger, in 1836.

In his large drawing of "Old Greyfriars and Newgate," published in our journal on April 21, 1894, Mr. H. W. Brewer depicts many of the conventual buildings cited above, together with the Church, the two Cloisters, the Outer Court, the City Wall as it bends around the northern and western sides of Grey Friars, the City Ditch, and Newgate. Mr. Brewer places the Friars' infirmary, with its cloister and chapel, erected by Peter de Helyland, in the north-east of the precincts. We may mention as well J. Storer's view (1805) of the Southern Cloister, with the arches, the boys' sweet-stuff shop built against the wall, and the old pump in the "Garden" of the foreground, H. Shaw's print (1825) of the old Hall, with the Whittington Library, and the Cloisters, and the two bird's-eye views of 1727-40.

NOTES.

The Education Bill.

So much has been heard of the Education Bill, "The Education Act, 1902," as it must now be called, that it is unnecessary to refer to it in detail. One point, however, must be noted. At the eleventh hour a clause has been inserted making the Local Authority liable for the fair wear and tear of Voluntary schools. This is an unfortunate clause, for it must necessarily cause much friction and expense both to the managers of Voluntary schools and to the Local Authority. It is impossible that there should not be a difference of opinion in regard to the term "fair wear and tear," and the Local Authority will be bound, in the interests of the ratepayers, to scrutinise claims very closely. Thus disputes are inevitable, and experience has shown that no differences are more difficult to settle than those which arise in regard to dilapidations. Every time also that a claim of the managers of a Voluntary school is cut down by the Local Authority, it will form a ground for attacks on the good faith of the managers. They will be accused of attempting to get the better of the ratepayers, and so forth. It is equally certain also that both managers and Local Authorities will require skilled advice in regard to the settlement of these claims, and thus this clause will add a substantial sum to the cost of education which would have been saved had the wear and tear clause not been inserted by the Bishops at the last moment. It would be in the interests of education if it were repealed next Session.

Hampstead Heath and the Railway.

THE railway on to or under Hampstead Heath is now (as we feared) inevitable, and the Hampstead Heath Protection Society are endeavouring to get the evil at least minimised by preserving the part near the proposed Tube railway station from being built over. They quote from the Hampstead Heath Act of 1871 the provision that "the Board" (the former Board of Works) "shall at all times preserve as far as may be the natural aspect and state of the Heath," a provision which is unquestionably obligatory on the London County Council as the successors to the Board of Works. The East Heath, as they remark, near the Hampstead Heath Station, has now almost ceased to be a Heath at all owing to the amount of building by which it is hemmed in. The West Heath was saved from the same fate by the purchase of Golder's Hill; and now the North-West Heath, close to the intended railway station, is in the same danger. The Society urge that the County Council should purchase three fields which now abut on this portion of the Heath. The effect of this would be to prevent any line of houses being built skirting the Heath, which will infallibly be done unless some such means are taken to prevent it; the rural character of the North-west Heath will then also be irretrievably destroyed, and a line of semi-detached villas will take the place of the hedge. It is to be hoped that this suggestion will receive every consideration; the cost of the purchase cannot be relatively great, and it seems a public duty on the part of the County Council to take decisive steps to prevent, as far as may be, any further alteration of the rural character of the Heath. The mere fact of the railway, and the station there, will be bad enough in itself.

Railway Companies and Public Policy.

THE correspondence recently published between the Committee appointed by the stockholders of the London and North-Western Railway Co. and the Board of that Company raises questions of general public importance. The Committee is an influential one, including men of such experience and practical knowledge as Lord Brassey, Mr. Burdett-Coutts, and others whose recommendations must attract considerable attention, but the Board at present seems unable to adopt them to any large degree. The chief recommendations seem to be greater co-operation between the rival Companies, greater economy in handling goods traffic, both by means of combined action and larger waggons, a fuller system of statistics (dealing more especially with the mileage and load), and combined action in respect to the increase of public burdens, local taxation, &c. With regard to the first head—co-operation—the Committee seem to have addressed themselves chiefly to the benefits to be gained in the goods traffic, but we submit that much could be gained in this direction by greater facilities being offered the travelling public in through communication over rival systems. The only co-operation at present exercised by the Railway Companies is a co-operation where two rival systems supply the same districts, and which is adverse to the public, viz., equality in fares and mutual agreements limiting the number and speed of trains, but it is common knowledge that through communication between two systems is made as difficult as possible, and the public has to sustain serious loss of time and inconvenience owing to an intentional failure of through communication. The sooner the railway companies realise that increased facilities of rapid transit throughout the country mean a largely-increased travelling public the better it will be for their shareholders. Seeing the serious depreciation in all railway securities, and the diminution in the dividends of many of the companies, it is somewhat surprising in the correspondence now published to find no reference to the vexed question as to the apportionment of charges to income and capital. A large section of the community is strongly of opinion that the present unsatisfactory condition of these undertakings is solely due to the constant increase of capital to effect repairs which should properly have been executed out of income, and the views of the Committee on this question would have been read with the greatest interest. It is, however, a matter for congratulation that the stockholders are beginning to take measures calculated not only to improve their own securities, but to be of benefit to the public convenience and the trade of the community at large.

The Engineering Standards Committee.

SOME of the recommendations agreed upon by the Standardisation Committee will shortly be published, and there is no doubt that they will receive a warm welcome from those engaged in various industries involving the use of iron and steel. The astonishing diversity at present existing in the dimensions of manufactured forms of iron and steel is largely due to the reluctance of manufacturers to take counsel together upon matters which really ought to be regarded as of common interest, and it is probably the result, in some degree, of arbitrary specifications prepared by Government officials and by a certain class of consulting engineers. One important benefit that may be expected to follow standardisation will be a very considerable saving in the expenditure of Government departments, and another of still greater value will be to enable British engineers and manufacturers to compete on more level terms with Germany, Belgium, and the United States. We learn that the sub-committee dealing with structural steel has reported that only twenty-three standard sections of channels should in future be rolled, instead of sixty-three as previously. Even then the number will be three in excess of the German, and nine in excess of the American numerical limit. Again, in angles of unequal sides, 30 standard sections are recommended in place of 59 as formerly, the Germans having 14, and the Americans 18 standard sections. In I-beams, 30 standard sections are proposed instead of 49, the Germans rolling 33, and the Americans only 17 sections. No less than seventy-one different sections of tramway rails, with merely trivial differences, are now rolled, and it is proposed by the committee that five only should be produced, ranging from 90 lb. to 110 lb. It has been estimated that the standardisation of such rolled sections will enable makers to save at least 5s. per ton, representing a total annual saving of something like 750,000*l.* per annum, while capital will not be wastefully expended in future upon special rolls and tools for the production of odd sizes such as are at present demanded. As the general committee includes representatives of all the leading engineering societies in Great Britain, as well as members of Government departments, there is every reason for believing that the recommendations will be regarded as authoritative by all connected with the iron and steel industries.

The Taff Vale Case.

THE action brought by the Taff Vale Railway against the Amalgamated Society of Railway Servants and some of its officials has

ended, as was almost certain to be the case, in favour of the plaintiffs. From the moment that the House of Lords decided that a Trade Union could be responsible in its corporate capacity for the action of individual members, the result of which this case is an example was sure to follow. If individual workmen unlawfully broke their contracts with their masters, they have hitherto been the only persons responsible; but when they are incited to do this by officials of the trade-unions, it follows, from the decision of the House of Lords, that the Union itself becomes ultimately responsible. All, therefore, that has to be done in order to fix responsibility on a Union is to establish some unlawful act on the part of a workman and a connexion between this Act and a Union. No change in the law can be now effected except by Act of Parliament, and we doubt whether the House of Commons is at present prepared to repeal the existing law. One result of the present state of it is that the practical irresponsibility of the workmen for unlawful acts occurring in a strike is now removed, since the Union, a substantial body, of which he forms a member, is collectively responsible. For the present, therefore, strikes will have to be conducted on strictly legal lines if trade-unions are not to pay heavy damages.

Underground Railway Ventilation.

THE views now expressed by Mr. James Keith, one of the experts who gave evidence before the Board of Trade Committee, on the ventilation of underground railways, are not reassuring either to the promoters or shareholders in these undertakings or to the travelling public. The condition of the air in the electric "tube" railways seems to be very bad and growing worse, and the means advocated by Mr. Keith for the ventilation of deep tubes, viz., the erection of air shafts equidistant between every two stations and rising to a greater height than the roofs of the neighbouring houses will hardly commend itself to Londoners, and will make them anxiously regard the largely proposed increase in such railway undertakings. London has never countenanced the disfiguring overhead railway, but if the breathing apparatus of the numerous proposed underground railways is thus likely to extend above ground, it may become a question how far they are less obnoxious than the trans-Atlantic system, which certainly offers some compensating advantages to those who use them as a means of conveyance.

Fire in Factories Let in Flats.

THE facts of the case Toller *v.* Spiers and Pond (reported in our last issue) disclose a serious deficiency in the provisions of that new statute, the Factory and Workshop Act, 1901, in its application to modern developments. The City Mills is a very long narrow building occupied as follows:—Messrs. Spiers and Pond occupy the building from the basement to the fourth floor as a factory, with the exception of the second floor, which is not a factory at all, or within the Factory Act. The rest of the building above the fourth floor is occupied as a factory by Messrs. Farwig & Co. The County Council, being dissatisfied with the means of escape in case of fire, served a notice on the owner of the whole building, in accordance with the Act then in force, and subsequently an arbitration was held under Section 14, Sub-Section (3) of the present Act, and in consequence the erection of a staircase from the third floor to the top of the building was recommended, and the owner became liable under the Act to daily fines in the event of non-compliance with the order of the Council embodying the result of the award in the arbitration, and the present action was brought by the owner of the factory against Messrs. Spiers & Pond to compel them to allow him to enter on the premises to do the work required by the order. The only provision in the Act conferring rights on the owner of a factory as against the occupier to carry out such works are contained in Section 14, Sub-Section (2), and the Court has now held that these powers do not intend to enable an owner of one factory to enter on those premises to do work necessary for another factory, or common to the two. In this case the Judge held these to constitute two separate factories, although one building, and that they could not be deemed tenement factories under Section 149, as each factory used its own mechanical power, and there was no "supply" of mechanical power within that section. It is true the Court points out that the order of the Council treating the building as one factory was bad, but it seems exceedingly hard that the owner of a factory who has been subjected to proceedings, on the face of them legal, should, in his loyal endeavour to carry out the order of a superior authority so obtained, have to incur serious and expensive litigation. Moreover, it is surprising to find an Act placed on the Statute-book which fails to afford protection from fire in circumstances which are now the rule and not the exception.

Proceedings to Acquire Land Compulsorily.

THOSE persons who have houses or land acquired from them under compulsory powers, an extremely large class at the present time, will do well to note the decision of the High Court in the matter of an arbitration between the London County Council and Burgess and Cross. The County Council for the purposes of the new street from Holborn to the Strand were acquiring a house in Bow-street. In accordance with the provisions of the Land Clauses Acts they had made a sealed offer to the owners or occupiers, but the claimants proceeded to arbitration, and only when the jury had given part of their verdict finding the premises insanitary, expressed their desire to accept the sealed offer, and the High Bailiff thereupon stopped the proceedings. The Council now applied for a fresh jury to continue the arbitration, and the Court granted the application. The effect of the sealed offer is in the event of the jury awarding any sum not in excess of the offer to render the claimant liable to pay half the costs of the arbitration, and it seems obviously improper for the claimant to delay his acceptance of the offer until he is in a position to judge what the result of the arbitration is likely to be, making the whole transaction one of "heads I win and tails you lose."

New Method of Dam Construction.

WHEN discussing an alternative route for the Nicaragua Canal, before the American Society of Civil Engineers, Mr. Le Baron made a novel suggestion as to the form of dam which he recommends for use either at Panama or Nicaragua. He believes that a masonry or monolithic dam would be objectionable at either place, owing to the injury that might result from earthquake, and which might necessitate the closing of the canal during repairs. His proposal, which is certainly worthy of careful examination, is to construct a loose-rock dam, enclosed in a heavy chain cable net, the dam to have a base of 360 ft., a crest of 10 ft., an up-stream slope of 1 to 1, and a down-stream slope of 4 to 1. The chain forming the net, he suggests, should be of 1-in. ship's cable worked into meshes of 3 ft. square. These meshes would be crossed by two ¾-in. cable chains, making four meshes of 18 in. square, all to be linked together by shackles at the crossings. In the first place the net would be laid flat on the river bed from shore to shore, and extended up the banks to the top of the dam, as well as for a sufficient distance up and down stream above and below the dam, so that the ends of the net could afterwards be drawn up and fastened on the top of the dam. A chain net would also be continued as an apron up and down stream of the dam, and covered with 2 ft. or 3 ft. of rock. This chain net would accommodate itself to the inequalities of the bottom, filling any holes caused by scouring. As the dam settles from this cause, the author proposes that stone should be added on top until a condition of stable equilibrium is secured. This method of construction seems to present no difficulties, and under conditions such as those prevailing in Central America it appears to promise advantages not offered by solid masonry construction.

Removing a Factory Chimney.

IT is not every day that a large chimney shaft has to be levelled in the midst of a busy city, and the method recently adopted for such an operation in Washington (U.S.A.) is worth notice. The structure in question was 153 ft. high by 15 ft. square at the base with walls nearly 3 ft. thick tapering to 14 in. thick at the top, and it contained some 250,000 bricks. The shaft was situated close to the principal thoroughfare of the capital, one row of buildings being only 90 ft. away, and other buildings within 200 ft. in a different direction. The district authorities stipulated that the stack must first be lowered 60 ft. by hand, and they then permitted the remaining part to be razed by undermining and by the aid of dynamite. Accordingly, the upper portion was removed, and two corners of the base were undermined. Holes were then drilled in the walls between the corners, and into them were inserted a series of dynamite sticks. At a given signal the explosive was fired by electricity, and, after a momentary pause, the shaft began to fall across the open space exactly as intended. In falling, the shaft broke into several parts, evidently owing to the resistance presented by the inertia of the upper parts to the movement first exhibited at the base. The débris was confined to a comparatively small area. None of the material was projected with any force by the explosion, and the bricks were deposited in a fairly regular wedge-shaped pile, comparatively few of them being broken. Nearly all those from the upper part of the shaft were completely separated, while the thick lower walls were left mainly in masses. In consequence of the pre-

cautions taken not the slightest damage was caused to the adjoining property.

The Future of Acetylene.

Some remarkable exhibits were shown in the lecture hall of the Society of Arts last week, when Professor Lewes delivered the last of the course of lectures upon "The Future of Coal Gas and Allied Illuminants." A small incandescent mantle, heated by acetylene supplied to the burner under a pressure of ten inches of water, and at a rate of one cubic foot per hour, emitted light of 146 candle-power. This efficiency is about seven times greater than that given by an incandescent mantle heated by coal gas under ordinary pressure, or about five times greater than that emitted by a mantle heated by coal gas under the high-pressure system. In connexion with his remarks upon the lighting of cars by acetylene, Professor Lewes exhibited some small cylinders charged with porous inert material (such as kieselguhr) impregnated with acetone, and then charged with acetylene under a pressure not exceeding 150 lb. per square inch. Acetylene in this form has been subjected to many severe tests, and it has been found that it may be used with such perfect safety that a special Order of the Secretary of State has been issued permitting the use of acetylene compressed in this manner. The lecturer proceeded to explain why the recent attempt to light London omnibuses by acetylene generated within the lamp did not prove successful, and expressed the opinion that, if an attempt were made to use gas stored in cylinders, lighting by acetylene would prove perfectly successful. The cost of lighting by acetylene would probably exceed that of lighting by oil by 2d. or 3d. per omnibus per week, but the acetylene would yield light so greatly superior to the miserable glimmer emitted by the oil lamps that the travelling public would at once appreciate the innovation. Another exhibit which attracted great attention was an oxy-acetylene blowpipe. The oxy-acetylene flame has a much higher temperature than that of the oxy-hydrogen flame, and when allowed to impinge upon a steel plate of considerable thickness it bored a hole through the plate in a few seconds.

Mr. Jungmann's Exhibition.

At Messrs. Dowdeswell's Gallery is a collection of pictures and portraits by Mr. Nico. W. Jungmann, the artist who first came into notice as a translator of Dutch peasant life into decorative pictures. The present collection contains some works in the old manner, but is diversified by a certain number of full-length portraits of English ladies, on a small scale (about quarter-size), which are in a totally different style, and seem to imply a wish on the part of the artist to take a position as a portrait-painter in this country. The results are not very happy; the ladies are immensely tall in proportion (ten heads high most of them) the necks in some cases too long, and the hands stiffly and conventionally drawn. Among the paintings of Dutch rustic types perhaps the best is "Watching Father," two thickly proportioned but pleasant-looking young women seated on the bank watching "Father's" boat, which does not enter into the composition. But the really interesting works are those of figures with faces of considerable beauty, clad in rich costumes which are drawn and painted with the most minute elaboration, treated in a flat decorative manner which is entirely conventional, but which nevertheless realises a great deal of beauty in a pictorial way. One of the best of these is "The Honeymoon," half lengths of two lovers seen in profile, covered with embroidery and lace, while a background is formed by an equally straight and flat representation of oyster pools and their workers, all gazing at the passing couple. There is real beauty of a kind in this; also in the series of half-lengths called "Part of a Procession," and in the larger work "A Lady in Lace"; a half-length in profile, apparently worked out of a crimson-mottled surface (it is not easy to say what) by cutting away the surface for the head and painting in the features. Everything is as flat and sharply cut as possible, and the luxuriant brown hair, delineated with great brilliancy, is partly brought out by fine lines indented with a sharp-pointed tool. It is an eccentric method of execution, hardly perhaps legitimate painting; but it is certainly effective in its way.

THE ARCHITECTURAL ASSOCIATION

An ordinary general meeting of this Association was held on the 19th inst. in the Meeting-room of the Royal Institute of British Architects, No. 9, Conduit-street, Mr. H. T. Hare, President, in the chair.

The minutes having been read and confirmed, and some nominations read, the following gentlemen were elected:—Messrs. K. W. Booth, R. T. E. Neeves, and W. H. L. Keay. The following gentlemen were, on the motion of the Chairman, elected by acclamation:—Sir John Taylor, K.C.B., Mr. Ernest Newton, and Mr. H. H. Wigglesworth.

Mr. H. P. G. Maule, Hon. Secretary, announced the following donations to the library:—"The Architecture of Greece and Rome," by W. J. Anderson and R. Phené Spiers, presented by Mr. B. T. Batsford; "Modern School Buildings," by Felix Clay, presented by Mr. B. T. Batsford; Post Office London Directory, 1903, presented by Mr. W. G. B. Lewis. A vote of thanks having been passed to the donors, Mr. Maule announced the following lectures, commencing: January 1—"Drainage and Water Supply," lecturer, Mr. Max Clarke. January 5—"Elementary Construction," lecturer, Mr. C. E. Varndell. January 6—"Elementary Physics," lecturer, Mr. H. B. Ransom.

The Study and Delineation of Old Buildings.

Mr. W. H. Bidlake then read the following paper on "The Study and Delineation of Old Buildings":—

The intimate association, in the title of this paper, of the study of old buildings and their delineation, might suggest that there was an inseparable connexion between them. Such, however, is far from the truth.

The study of old buildings does not necessarily involve their delineation, or the delineation of them inevitably imply their study. This statement seems self-evident—perhaps too self-evident to attract attention. A student is, as a consequence, advised to sketch and to measure old work without any qualifying advice as to what to study or how to study. Growth is not helped by unsuitable food badly digested. Measuring up bad examples, and making drawings of them in a mechanical spirit, will neither develop a student's taste nor his knowledge. Perhaps it did not occur to him that either his taste or his knowledge required developing. "Then," you ask him, "why make any measured drawings at all?" "Well, I thought it might be a good thing to get them published in one of the building journals," or, "One must have a set of show drawings to take round the offices to get a berth."

More likely still, they were made to compete for one of the Institute or Association prizes, or for the A.R.I.B.A. examination, or to play their part in a deeply-laid scheme, worthy of an American company-promoter.

For, if a student has made his finished drawings at a school of art, he will first send them in for a local prize. Having won this, they will appear at the National Competition, perhaps with a gold or silver medal award. They will then be passed on for the Institute Silver Medal, and the next year they will once more reappear, supported by sketches for the Pugin. They will by this time have been published in the building papers and the "Architectural Association Sketch Book," and will also have won for their author a seat in the office of some prominent London architect. And, finally, they will serve as testimonies of study for the Institute examination, if, indeed, they do not eventually once more re-assert themselves in the garb of a monograph.

And all this with the same set of drawings! Well, if measured drawing has not advanced the student's taste, it has at least helped to stimulate his commercial instinct.

But where does the study of old work come in?

It would be interesting to learn how our wide-awake student came to select his subject. His principle is, the greatest effect for the least labour. Sound commercial doctrine. It must look costly, but be cheap. This man might verily have made his fortune if he had not elected to be an architect.

He selected the portion of the building which he measured up because it was easy to get at, and would make a telling set of drawings.

Another student would select his subject "because it had not been done before, or because it was one of the subjects recommended by the Institute."

This desire to make the drawings rather than study the building naturally influences the method of work.

When at length he has arrived face to face with the subject of his choice, the student sets about drawing and measuring, and having taken all the leading dimensions, and made more or less freehand drawings of the mouldings, and taken any further notes necessary to complete certain elevations or sections he has decided to illustrate, he buys, or himself takes photographs of ornamental detail sufficient to enable him to elaborate the drawings at home. Perhaps, a month after his return, and a hundred miles away from his building, he will commence plotting out his measurements. Some will not work out, and there is no chance of correcting them. He assumed the walls were at right angles, and that the whole of the work was set out with the rigid accuracy of his tee-square and set-square, and as, in common with most old work, it was not, his measurements were thrown out. An examination of the photograph is then substituted for the study of the building, and a draughtsman's skill covers a multitude of inaccuracies. The drawings win the prize; that is sufficient.

Such measured work is not study; indeed, I would go further and say such measured work prevents study, by substituting the counterfeit for the genuine.

I lay stress on this distinction, or you will say, "Thou did'st come here to bless measured drawings, and lo! thou hast cursed them altogether." What, then, shall we say of the student who has substituted study by photography, for measured work and sketching.

It would be absurd to deny the value of photography to an architect, or the delights of its pursuit; but to take photographs of a building is not the way to study it. Here is a fine parish church. Suddenly the amateur architectural photographic enthusiast appears. He manœuvres for a good point of view; sets down his camera; focuses; draws the dark slide; turns his back to the building; removes the cap, and studies his watch; claps the cap on again; packs up, and rushes for the station.

The enthusiast objects that this description is a caricature. Very well. Photograph at leisure, and with great care; still, how can you judge the proportion of a façade when you see it standing on its head. "Do you know such or such a church," asks one. "Oh yes, rather. I took at least a dozen snap-shots of it last summer. I haven't developed them yet, but I hope they will come out all right."

The amateur photographer objects with increased resentment. "It is absurd to suppose that you can spend some time about a building, without forming a very good idea of it." Yes, but he forms his idea of it when he is walking round and thinking about it, just the precise part of his stay when he is not photographing it.

Clearly if he is taking a dark interior which requires an hour and a half's exposure, he must be doing something meanwhile. So that we may grant that one of the ways in which photography is an aid to the student is that it compels him to wander round and about a building, and observe it more in detail than he otherwise would do, whilst the cap is off his lens; that is, unless he avails himself of the opportunity to go off to the inn and get lunch.

Happily, those students whose ideal it is to obtain as many prizes as possible with one set of drawings, or the minimum of study, as well as those who regard photography as an efficient substitute for pen and pencil, are in the minority, but it is as well to recognise wrong methods whilst we are in search of right ones.

Our aim, then, shall be to study the buildings themselves, and only to make drawings of them as a means to that end. If, as supplementary to this study, our drawings have been made with that artistic finish which is peculiar rather to the draughtsman than the student, so that they are awarded a medal or a studentship, so much the better. For no kind of study is assisted by slovenliness of expression, and therefore the careful study of a building should be embodied in the most painstaking description, both with pen and pencil. Herein lies the true connexion between the study of old buildings and their delineation.

By this study we seek to increase our knowledge and sharpen our æsthetic taste. This is our aim, and our subject will be selected accordingly.

It will certainly be a subject with which we feel in sympathy, one which we feel drawn to by excellences of one kind or another which excite our enthusiasm and our desire to emulate them.

At the same time, let us cultivate catholicity, remembering that want of sympathy is often due to ignorance, and that, whilst sympathy may stimulate study, study in turn may awaken sympathy.

If, however, we feel that a building is bad in design, and that we shall learn nothing from it, we will not make measured drawings of it because no one else has, as yet, made them, or for any other reason equally foolish.

But how shall we study our building, or such part of it as we may have selected? By measured drawing and sketching? What, are these the only means of study? They are certainly the most frequently recognised means with architectural students, and, perhaps, there are some who think them all-sufficient.

I believe there are occasions when a pipe will serve us better than a 2-ft. rule. A pipe makes one contemplative, and to walk round an old building in a contemplative mood, is to have put oneself in train for studying it; for catching the spirit and romance of it. Under its kindly influence, the imagination will conjure up from the stores of one's historical and archæological learning—if it is there to conjure up—the conditions of society and of the craft guilds, the observance and the ritual of the church, and the quaint superstitious customs of the country folk, at the time when the stones of the building were put together, and which find expression in its arrangement and decoration. And falling thus into a sympathetic reverie, the eye wanders over the building noting this or that point of interest, whether of design or construction. Then, leading our thoughts back to modern times and the conditions of to-day, comparing and criticising, and drawing conclusions, let us take out our notebook and write down our impressions whilst they are still warm, whilst the glow of feeling unlooses our powers of expression, whether by descriptive note, or pencil sketch.

Very likely the building will live in your memory through all your future life. For we remember most what we feel most.

It is particularly important to make a general study of the whole, before making a particular study of a part, so that the relationship and proportion of one to the other may be adequately perceived.

One may sometimes see a student fasten on some detail which attracted him on his first approach, and devote his time so exclusively to it, that he leaves without any idea of its setting, or the part it played in the whole design.

Do not, therefore, study details without making a key sketch sufficient to show their position and relative value to their surroundings.

Do not accept a design because it is old: it may be old and bad. Always keep the critical faculty on the alert. This habit is of the very essence of an architect's study of old buildings. You will not regard Salisbury as a model west front because it was built in the thirteenth century. Standing in front of it, you will question yourself: Is it good? Could it be improved? What are its defects? Perhaps, it will remind you of a comparison you have made between the west fronts of Siena and Orvieto cathedrals, or your thoughts will turn from the confusion and irresolution of Salisbury, to the commanding lines of Notre Dame.

Then take out your note book and try your hand at it; take the west front as it is, and with as little alteration as possible, pull it into shape.

If you have a companion with you on your excursion, let him do the same, and then compare notes and discuss it together.

A companion of the right sort, that is one who is equally bent on study, is a great gain on a sketching tour. Of course, he can hold the tape, but he can be of much greater service than that. He can come up and ask you what you think of such a building. This compels you to give an answer. If you reply merely "Oh! very good," you are depriving yourself of an opinion more than you are depriving him—your own opinion, which you have not taken the trouble to form. If you are wise, you will treat his question seriously. You will look at the building well, and in a critical frame of mind. Not only will the process of so doing lead you to notice many points which you would otherwise have passed over, but you will have subjected yourself to the healthy exercise of making up your mind. It will not only reveal the building to you, but you to yourself. Your companion will probably have formed some opinion of his own before asking yours, and he will differ from you in some points. This will lead to a more careful scrutiny of the building in search of evidence in favour either of your view or his, and in the end you will both have gained in knowledge, and in the formation of a critical taste. I know hardly any advantage in the study of old work greater than the discussion of it with a fellow student who is thoughtful and well informed.

If you are alone, do not on that account fail to come to a conclusion as to whether you like or dislike any building worth attention, and why you like it. Keep a notebook for the purpose of writing down a critical description of such buildings. On first commencing such a practice, you will be astonished to find how vague your impressions are.

I am not here referring to those agressively dogmatic opinions which characterise the very young student, who always regards the work of contemporary architects as beneath contempt. Such opinions are not the result of thought, nor are they founded on knowledge., they are simply a little preliminary crowing, necessary in personal development, and remind one of Dr. Jowett's remark to his students, "For we are none of us infallible, not even the youngest." Every student has a right to the belief in his own infallibility, until life disillusions him; it is the man who has no opinion of himself, and is unable to form one of anything else, that is beyond hope.

As time goes on, the judgment, well practised by such method, is likely to become more sound and more self-reliant, for the mind will have laid up an ever-increasing store of knowledge for comparsion and co-relation. Thus, the study of this building is amplified by a previous study of a similar one, and the points of difference are noted, and the reasons for them investigated. Perhaps it is that the building material is different, or that, being rather later in date, certain decorative forms show signs of change. In a third building, of still later date, these signs are amplified, and the student comparing this with that, begins to detect in the various examples which at first seemed isolated and apart, a law of common development, a law of life. He now begins to generalise, timidly at first, but, as new observations confirm or modify his previous conclusions, ever with greater boldness and wider range of view. He will then be in a position and have a right to theorise, and will, from the habits of mind he has acquired, always bring his theories to the test of his facts. Now, compare the position of a student who has adopted this method of study—although, content with thumbnail sketches and notes, he may never have made a measured drawing—with the one who made one set of drawings, and swept all the prizes away within reach. The world, judging by tangible and visible results, proclaims the latter the coming man. So he is at first, the other's day comes later but lasts longer.

How many prizes there are for drawings; how few for critical study! Is it not possible, that at some future time, either at the Institute or the Association, more awards will be given for thinking, and especially for thinking and drawing combined? I think the essay prize is one of the most useful that the Institute offers, but the subject set is often one which the student can only illustrate by copying prints from books or photographs, and stimulates his reading rather than his critical faculties.

What I think is wanted is a prize for an original and critical study of some particular class of buildings, or parts of buildings, easily accessible in this country, to be illustrated by sketches and measured drawings made by the student from the buildings themselves.

In the study which we are considering, it will be very necessary to supplement work on the spot by also studying the subject in books, so as to furnish ourselves, not only with the conclusions to which others have arrived on any particular subject, but to acquire that general historical knowledge which, with the help of our own imagination, will enable us to set the designing and construction of the buildings within the social and historical environment of the time.

How can one study Stokesay Castle or Haddon Hall, and understand the arrangement of their plans, without knowing something of the social and domestic life of the times. Looking at the buildings will not teach us this, however cleverly we may guess at the purposes of this or that. We must go to Hallam and to Green.

Again, we must learn about the conditions of labourer and craftsman, of the prevalence and organisation of guilds, of the position of the designer, the magister, of the force and direction of tradition, of the tools in use at the time, and of the methods of working materials and incorporating them in the building.

We must not forget also, to study the traditions, the ritual, and the history of the Church so far as they affect ecclesiastical building; this will also involve some knowledge of the distinctive requirements of the various religious orders.

In the same way, some knowledge of the methods of attack and defence of the period will help us to understand military architecture.

All this means systematic reading, which perhaps, the everyday student does not feel disposed to undertake. Well is it for him, that the Institute examination compels him to acquire some knowledge on these points in spite of himself.

Vitruvius considered in his day that an architect should be a man of many accomplishments, and now as then, an architect's culture will inevitably find expression in his buildings.

In addition to this more general study, we must further investigate the circumstances of the particular building we are examining.

To do this, we must find out what we can of its history, and the part it has played, and was intended to play in the past.

We must especially inquire into the properties of the local materials of which it is built, and of any traditions of working them which still survive.

Old buildings are apt to seem impersonal to us. The colours with which Nature has decorated them, as if eager to deceive us that they are her work and not man's, give them the air of being the product of the land around them, like rock and tree, and the human life that has thronged them since that far-away time when they were built, confuses the vague glimpses we may catch of their founders like a veil drawn before a face. But we must not forget that human nature was then as it is now, and that these buildings were designed by men so similar to ourselves, that if one of them were to return to earth he would probably drop into our modern ways in a week; and we may therefore look at their work as we should that of a living architect, and try to read what was in the mind of the designer of this building or that, and ask ourselves, "What were his aims?" No doubt he was hedged in by limitations similar to those of to-day. Even in the days of the Great Pyramid men could not build without cost, and they have not succeeded in doing so since. The whims of the client must at all times have stolen an architect's sleep. I think Magister Mutius probably found Pliny a very exacting client.

The limitations of site must have influenced all but the Romans, who thought nothing of excavating the hill for the level Forum of Trajan, or of levelling up the ground on a gigantic concrete platform for the Thermæ of Caracalla.

The adaptation of a building to its site should engage the most earnest study. An unusual site, whether of shape or level, is the doom of the incompetent architect, the triumph of the skilful one.

From the Athenian Propylæa and Erechtheion to the rock of Mont St. Michel, architectural history presents one long array of buildings, whose architects have presented them to the world as monuments of their genius.

Next notice the limitation of material, and its influence on constructive and decorative forms.

Ascertain the kind of stone procurable, whether in blocks or slabs, and their available size, and note how this has influenced the character of the building, and given an individual stamp to the buildings of a particular locality. The monolithic window-jambs of a Yorkshire cottage might be compared with the jointed jambs of a Cotswold one, and the influence of the use of flint in the Eastern counties might similarly be noted. Examples of the influence of material on design are to be found everywhere, however, to the seeing eye, and it is not within the scope of this paper to attempt to enumerate them. The point to be emphasised, is the extreme importance of the subject to the student of old buildings. The particular tools in use have also played their part in the shaping and decorating of buildings, as in the dressing of stone or the adzing of timber. The use respectively of the chisel or drill in Roman acanthus sculpture, and of the adze or chisel in Norman carving, gives a very distinctive appearance to the work.

Doubtless, there are many other limitations which have helped to determine the character of buildings, and which the student will detect in the particular building under study.

In narrowing our attention to any particular building we shall first of all examine the plan. Study of plan is of supreme importance. Within the plan somewhere, somehow, lies the soul of the building; all else is but the embodiment of it.

See how the various rooms are grouped together to suit the needs of the time, and note particularly the entrance, the hall, and the staircase; also the position of the plan with regard to aspect and points of approach; how the levels work out with regard to the site, and how the house sets with the garden.

In ecclesiastical and other work the plan in the same way is the key to the building, and merits our first attention.

Having examined the building from within, next see how the plan, with which you will now be familiar, finds external expression.

And first of all, note the way in which it is roofed, and the manner in which the various parts are grouped together. These are matters of great importance in architectural design, and must always have been so, and must have been considered by the architect when he was engaged in the arrangement of his plan.

How frequently nowadays are they not left to take their chance.

It is the more important that the student should give his attention to these matters of massing and grouping, because by this means he is led to study buildings in the solid, and an antidote is, in a measure, found against the tendency to façade and elevation designing, inseparable to the working out of a building on paper.

How much may be learnt from the design of old chimneys, and the manner in which they contribute to the conception as a whole; how well was their value recognised by their builders. On the other hand, one may ask, how often does an architect nowadays consider the disposition of his fireplaces in the plan, so that the chimneys rising from the roof may group well together from the more important points of view.

Connected with this subject of roofing and chimneys, as well as with that of gables and turrets, and cathedral towers, is that of sky-line. Study it at the time of sunset—I will not be so impracticable as to say sunrise—when the purple outline is silhouetted against the sky. And, in like manner, learn the value of simple masses in twilight and moonlight, when the disturbing details are suppressed. From the study of these more general features you come to that of details, or it may be that in any particular building, it is some detail alone that is worth attention. Every building must, of course, be studied for the features of excellence it possesses, as a bee draws honey only from those flowers which produce nectar, and that critical sense, to which I have already referred, will prevent us from thinking that we recognise them where they do not exist.

There are one or two ways by which, I think, we may make our visits to old buildings more valuable to us, which I may refer to in passing.

And one is to set ourselves to plan and design some building of the same kind that we propose to study. To fully realise the difficulties of an achievement, so as to observe how they have been solved by others, one must make a similar attempt; this will reveal to us what those points are about which we need the help of other minds.

And another excellent method of study is to take up some particular subject, such as, for instance, the design of chancel screens, and make a comparative study of it, just as if one were preparing an essay or a monograph on the subject.

I have, hitherto, considered the study of old buildings from observation and examination, with the aid of the note book only, we must now ask how this may be supplemented by their delineation.

I say supplemented, because I think we should not regard old buildings as dead and lifeless forms to be dissected piecemeal. They are organic creations still instinct with antique life, and we must learn to know them before we portray them; we must examine the building as a whole before we begin to devote our especial attention to a part. We must be biologists as well as anatomists.

Now in considering this delineation of old work, there are two factors to take note of: our subject and ourself, and we must be dutiful and just to both.

We must not run away from the original, for the sake of a flourish of the pencil, on the one hand, nor need we, on the other hand, suppress any distinctive style of draughtsmanship which we have made our own, and which is rightly the expression of our own feeling, and our own individuality.

An ideal measured drawing or sketch is one which truthfully represents the building, but which is at the same time executed with all the verve and character of the draughtsman.

There are some buildings which would be barely interesting, as represented by measured drawings, did not the force of draughtsmanship fairly rivet our attention.

Indeed, some of the finest buildings, which are fine because of their uninterrupted surfaces of wall and their bold projecting masses, are, if tamely represented by measured drawings, reduced to a few thin ink lines straggling over an expanse of the whitest Whatman paper.

On the other hand, measured drawings must be line drawings, and it would be absurd to shade them up to give a suggestion of projecting surfaces in a picturesque fashion, although the reliefs might be systematically indicated by colour washes, after the French manner, by cast shadows.

I think myself, however, it is best to leave the shadows alone. Measured drawings are for architects only—the public do not understand them, and are not interested in them—and architects would at once perceive the relative value of the surface of elevation from the accompanying plans.

It is here that the value of sketching comes in, for it enables us to judge the building as a solid. And here, too, in an especial degree the draughtsman is justified in making his drawing or sketch expressive of himself as well as representing his building. Affectation and trickiness are to be severely deprecated, and there is enough of both in the draughtsmanship of the day.

We do not need to picture an innocent old manor house as a snow building relieved in aggressive outline against the blackness of an inferno. The method we shall adopt in representing any particular work will depend upon the character of the work and what it is of which we wish to keep a record.

If it is a façade, we may make a measured drawing to a small scale; if a decorated sedilia, then one to a large scale; and in either case the drawings will be accompanied by a sketch plan, showing the position of the part which is illustrated; and the mouldings and details will be drawn out full size. All this will be done fully and thoroughly on the spot.

If, on the other hand, it is the grouping of chimney and gable, the play of surface, the picturesqueness of setting, and a hundred other reasons, we shall find a sketch the most serviceable.

If, again, we wish to remember the charm of colour due to the use of various materials, or some definite scheme of painted decoration, a water-colour sketch, or a tinted pencil drawing will serve us best. Or, if the skyline of some building, seen against the evening sky, attracts us, some brown paper and a piece of white chalk will be useful.

Our object is to catch and fix some particular point or feature which interested us, some beauty which excited our enthusiasm, and we may seize the means readiest at hand, or best for our purpose, as the case may be, our only care being that we possess ourselves of our aim whatever the medium. If we have any artistic power, we shall find it will also lend itself to our self expression.

Whilst we may well need our colour-boxes for the purposes I have described, we shall not, as architects, require to make water-colour studies of buildings whose charm lies in the tints of old age, the setting of foliage, or the accidental colouring of sunset. Of course, as artists, we may indulge in such, but it forms no part of the study of old buildings.

But whatever we do, let us keep clear and active that critical faculty of which I have spoken earlier, so that, whether we are making measured drawing or sketch, we should remain conscious of the weak points of our subject, and not lose ourselves in the glamour of its old-world charm.

To this end, let us write down in our note-book what our thoughts and impressions are at the time we are making our drawings, giving little marginal sketches illustrative of the manner we, at the time, considered the work might have been improved.

As regards the actual *modus operandi*, it would, I know, be impossible to say anything with which you were not already well acquainted.

For sketching a block 10 in. by 10 in. is a very convenient size. Some prefer cartridge and some Whatman, whilst others would use sketch-books made of metallic paper. A miniature tee-square is sometimes valuable for use with the sketch block, for setting up one or two guiding lines, but not to unduly assert itself. If, moreover, the tee-square has a scale marked on it, it is useful for plotting out a plan or measured sketch. Some find cross-ruled paper convenient for this purpose. Pencils should be of good quality, and there is more than one way of sharpening and using them. It is impossible to give any character to a sketch, if the pencils are too hard or too sharp, and if the lead is brought to an edge rather than a point, one can get a greater latitude of stroke by using either the edge or the broad side.

A sketch is not an elaborately-finished pencil drawing; it is an abstract, embodying just those features in the original it is desirable to portray. Certain parts will, therefore, be more or less finished in detail, while the rest are merely indicated by a few expressive lines. The lead pencil must be spared, as if it were precious, except at those points of telling shade or accent, where it may be rich and black.

A few colour washes, or strokes of coloured chalk, may sometimes be useful to record the local colouring of material. Some have done excellent work with graphite, treated like a neutral colour wash, for indicating light and shade, but it is not a very sympathetic medium. A few dimensions on a sketch, with one or two sketch details in the margin, will make it more useful.

It is, of course, unnecessary to insist here on the value of a complete knowledge of perspective. All measured work should be plotted and drawn out to scale on the spot. Capitals and other curved work may be merely indicated in these drawings, and numbered, and large freehand studies in soft pencil, crayon, or charcoal made, and distinguished by corresponding numbers, which will enable one to finish up the scale drawing afterwards, if necessary.

Do not assume that everything is set out with rigid accuracy, that the plan is always rectangular, that two halves are alike, or that flowing tracery can be set out from centres. If we cannot perceive the absence of the mechanical in old work, we shall be blind to one of its great charms.

Always show the stone jointing of the more important and decorative parts, and of the tracery of windows, and clearly indicate the treatment of wall surfaces. In the same way

show the jointing and framing of carpentry, and do not hesitate to add explanatory notes to the drawin .

Mouldings should always be drawn out full size and carefully measured. Strips of lead and such contrivances for obtaining their contour are worse than useless.

Place the arch mould over the jamb mould, and show the outline of the caps, and as a rule, make all your full-size details as you would if you were sending them to some mason or carpenter to be executed. They should have a business air about them, not a show-drawing look.

If, however, you are proposing to send them in for a prize, arrange them carefully on sheets of uniform size mounted on cardboard, and do not think you are making them look more artistic by some ridiculous and fantastic printing.

The joys, and the sorrows, of a sketching tour might well claim an essay to themselves, but it might be of service to indicate some of the items of equipment.

Of course, pencils, brushes, instruments, scales, colour box, water bottle, sketch books and sketch blocks, tape, plumb line, and level must be included.

A 2-ft. rule in your pocket is indispensable; so, too, is a 5*l.* note. Plenty of drawing pins, but do not leave them about on cathedral chairs. A sketching stool—a collapsible one—but not while you are sitting on it.

A double elephant is naturally too heavy to carry about, but half a double-elephant board, and a roll of paper to correspond, is a useful size. The tee square will, of course, be made to suit, and if the board is accurate and square, a set square may be dispensed with; it is only one more thing to forget and leave behind.

Callipers will be needed to take the diameters of shafts and mouldings, and a stout piece of copper wire serves as a calliper for larger shafts. A 5 ft. or a 10 ft. jointed rod is also necessary.

By a little ingenuity an American leather satchel can be contrived the size of the drawing board, with pockets of various sizes, and the whole strapped together with a handle-strap, the sketching stool, rod, and tee square being threaded through the back, and a leather label attached in case you should leave it all in the train. With all this equipment, and a few week's stay in a good architectural district, you will no doubt enrich your sketch book, and what is of still more importance, you will increase your knowledge and educate your taste, which will be reflected in those buildings which you may yourself have to design. And, recognising their charm, perhaps some student of the far distant future, whose great-grandparents are not yet born, will measure up *your* work, now mellowed with age and Nature's tints, and speak sympathetically of those dear old architect's of King Edward's reign, who knew so well how to express their soul in their work.

Mr. W. J. N. Millard, in proposing a vote of thanks to Mr. Bidlake, said they had heard a lot of very valuable advice. Those who were just starting their careers, as well as those who had gone through some experience, must be grateful to Mr. Bidlake for his remarks. He had been thinking that they should go back to the beginning of the whole matter, and ask why they studied and delineated old buildings. He suggested that the only reason worth considering was that they wanted to know something about those buildings. One would think that was self-evident, but there were drawings not uncommonly to be seen of old work which made one doubt whether the draughtsman had any desire to know anything about the buildings he drew. However far such drawings might carry a man as a draughtsman they could take him very little way indeed as an architect. He would suggest that if a man was to be an architect he must know what he studied and delineated—know all he could get to know about it, not only how it looked, "but how it is." There were two sorts of drawings required: the perspective drawing, showing how the building looked, and the geometrical drawing, which "shows how it is." Even when they had drawn a building they had not got to the bottom of it. The great aim of the study of a building was to know the whole life-history of it, or as much as they could of it—how it came into its present shape, and what influences were at work upon the minds of the men who fashioned it and thought and carried it out. That involved the study of history, and it came to this, that a serious student of architecture, of existing old or modern work, was a student of history, though he might not know it. Architecture was a branch of history, or it could be treated as such in the study of it. He thought we were apt to think that it was enough to draw a building to know all about it, but it was not. And in drawing it, as Mr. Bidlake said, the plan was the root of the whole matter; and if it was an old building in this country, especially an old church, they would find that, in ninety-nine cases out of a hundred, its plan was not all one design, and that it was not all designed or built at one time, and they would realise in time that the whole thing was a growth and was not a complete design—that it was the result of a number of men working upon the work of one another; and when they got to that stage of their investigations they wondered which man did this work, and which that, and which was done before the other, until at last they arrived at something like a life-history of the building: how it began, how it went on, and finally how it is. If they were content merely to draw it and to think it was always like that, they had not learnt all about it; that certainly applied to about nine-tenths of the old churches of this country. It was possible to imagine that the student's horizon would widen as he went on. Methods of drawing were interesting and a man must have his own method just as he had his own handwriting; it might be very bad, and, if so, he wanted training, for a man could improve himself by basing his methods on the methods of those who were successful. But, after all, the methods were only the means to an end, and if a man was going to be an architect and produce work of his own, he did not want to have his ambition turned in the direction of being merely a capable black-and-white draughtsman, and to think that by that means he was going to be an architect. He would forgive a man for rude and crude sketches, if only they showed that there was something in their subjects that the student wanted, and that he had gone to work as directly as he could to get it. He did not care how rough the notes were if in the time available the student had got what he wanted. The wanting to know was the great thing.

Mr. Arnold Mitchell seconded the vote of thanks. He said that Mr. Millard's ideas were those which those who had known him for a good many years knew that he put into practice, and if one were to be at all critical of the beautiful show of drawings there that evening, it was because they had excluded some of Mr. Millard's own most interesting and valuable sketch-books. The literary and polished paper they had heard that evening was one which, greatly as they had enjoyed it, they would enjoy still more when they came to read it, for there was so much in it. As to photography, the Association had a Camera Club, and in the presence of several of its most distinguished members it would be rank heresy to say anything antagonistic to photography; but though he did not want to say that the Camera Club was wrong, or to abuse the photographer, he thought that most architects would agree with him that the moment a man began to photograph he was lost as a sketcher, and when a man ceased to be a sketcher what an enormous amount of pleasure he lost in his work, and what an enormous amount of information he passed by! They had heard about the hour-and-a-half exposure and the pipe; no doubt the theory was sound that the long exposure gave ample time for contemplation, but generally he thought too much attention had to be given to the development to make it possible to properly study the building. By all means go in for photography later on in life, but first do the hard work. He had been greatly interested in one remark, *i.e.*, that the critical faculty should be cultivated. By all means; but did they not cultivate it? Most of them at some time or another had attended the delightful Saturday Architectural Association excursions, and if there was one thing more noticeable than another on these occasions it was the wealth of strong language and forcible expression used by members to criticise and pitch into one another's work, he did not think it was necessary to offer members of the Association advice on the art of criticism. As to drawings and sketches, Mr. Bidlake's modesty had prevented him exhibiting his own drawings, which would have been an interesting illustration of his paper, for he could not recall a finer delineation of old work than Mr. Bidlake's measured drawings, which won the Pugin studentship nearly twenty years ago, of that delightful little chapel at Ely—Prior Crauden's Chapel. The drawings had been published, and he (the speaker) suggested them as models of what measured drawings should be. Vitruvius spoke about the accomplishments which the architect should acquire—which he needed. He could not help thinking that the accomplishments which brought success, at all events at the present day, were outside purely architectural practice: had they not all heard of architects who "danced" into practice. There was another point which it might be well to emphasise, *i.e.*, the desirability—the great desirability many of them who had worked hard in the delineation of old buildings would say — of finishing drawings on the spot and not touching them afterwards. Of course, in measured drawings it was almost impossible to produce highly-finished drawings without further work upon them at home; but sketches and the slighter sort of measured work should not be touched after the sketcher had left the building. If the thing was incomplete, let it be so; they ought to have got out of it the good they wanted and their object was not to turn out acres of finished drawings; they wanted to get the value that the study of the thing would give them. If they had got that value they could tear the drawings up, for what did it matter? They would in the course of time finish many drawings, and they would get piles and piles until they had got more than enough. Instead of touching up these unfinished drawings they should study something else As to the difficulties of measuring, those difficulties were sometimes overcome in an extraordinary way. A story was told of Burges—how that he was desirous of finding out the height of the interior of Beauvais Cathedral, which was, of course, difficult to get. It was said that Burges got a ball of string and, climbing up into the groining, let the string out with his keys attached and afterwards measured the exact length of the string. In that way Burges got a dimension which was no doubt as accurate as any in the standard works published. There were many men who said they did not sketch, and that they could not do so, although they had tried. That was all nonsense. They could not run before they walked, and they had, of course, to learn to sketch: they had to go through the mill. All sketchers could recall the disappointing hours spent patiently trying to work out something satisfactory. The thing was to keep on until they succeeded. They would have several most unsatisfactory weeks at the start, but satisfaction would come if they would but stick to it. They should sit down to a big-scale drawing, and keep at it until they had made something of it, using their indiarubber again and again. He never met a student who was able to make satisfactory sketches without persevering with his preliminary work. The young student should not be discouraged; if he persevered, the result would be success.

Mr. G. Lucas said that it seemed to him that sketching was a modern accomplishment of the architect. Would Mr. Bidlake give some hints as to how the old architects managed to produce such beautiful work without the process of elaborate sketching? He (the speaker) most strongly advocated plotting to scale on the spot, and not so much pretty sketching in a sketch book, but actual hard studies on a drawing-board in a building. What Mr. Millard said was most fascinating as to the history to be read in a building. Take a fifteenth-century church: if they studied it carefully they would realise that it contained the whole history of the parish, and that its plan and form, in later days, arrived at through a series of extensions and alterations, were largely influenced by the early shape of the church.

Mr. A. T. Bolton said he thought the best thing for the student to do was not so much to start sketching at once as to measure; for this reason: the result of the sketching was unlikely at the beginning to be satisfactory, and of course represented nothing of any solid value to the student. If, on the other hand, the absolute beginner started with measuring, he would have done something solid by the end of the day: increased his information in regard to the building, and would have learnt something about the materials and construction and

a little about the plan. In that way he would be preparing himself for the more fascinating art of sketching. Men who had been successful as sketchers had begun by measuring, and had done more than those who worked on the inverted order. The principal point of the paper was this: Mr. Bidlake told them, and told them correctly, to study the old buildings, and not to bother too much about the appearance of their drawings. But a student who acted on that advice, and who came home after a tour, and whose drawings were hung on a wall in a gallery with the work of other students, would find that people (even people who gave advice not to think so much about the drawings) would cluster about the delightful water colour and other pretty drawings, and would neglect one's serious and solid studies. That was the human nature of the thing; we all know what is good for us and what we like. What he would say to the student was: "Make up your minds, if you accept the excellent advice of Mr. Bidlake, not to be disappointed if, when your work is exhibited, your friends do not recognise in it the value which your work has for you." A student should try and get certain conclusions in this matter, and should realise what he intends to do, and then, as Mr. Millard said, he was likely to do it. He thought there was nothing of more value to the young student than to learn the good methods of older students, for the amount of misinformed labour a student went through for want of advice was often lamentable. A man went on a tour and saw things which he admired and enjoyed, but often in a month after he had returned he had forgotten all he had seen, for he had not realised the way he ought to work in order fully to avail himself of his opportunity so that it might not be a lost opportunity. He knew students who had been abroad for as long as a year and a half and who, three or four years afterwards, had had to express their sorrow that they had wasted such a splendid opportunity because they did not know how to make use of it.

The Chairman, in putting the vote of thanks to the meeting, said that the most essential point in the sketching and studying of old buildings was that during the whole time the student was drawing he should be thinking of what he was doing. One of the greatest mistakes was merely to draw a thing in a mechanical way without understanding and appreciating what one was drawing. It was also very essential to analyse the component parts of a thing and their relation and proportion one to another all the time one was working. One of the points Mr. Bidlake referred to was a certain trickiness in drawing—tricks which were adopted by a number of clever draughtsmen to produce pleasing pictorial effects. Those tricks should be avoided: they induced one to think more of the pictorial effect than the result one was aiming at, which was to acquire a certain amount of knowledge as to the building itself. Really the most valuable kind of sketching was not of a pictorial nature at all, but rather of the nature of notes on the various details and features of the building being studied. As to photography, what Mr. Mitchell had said was in some respects unjust, for photography had a value in many ways. One of the ways was that by the aid of it one was saved from the temptation of sitting down and making a pretty sketch of a building when there was no time for that. A photograph could be studied at leisure, moreover. He thought the vote of thanks should include the gentlemen who had lent the beautiful drawings there that evening and which had added to the interest of Mr. Bidlake's valuable paper.

The vote of thanks having been heartily agreed to,

Mr. Bidlake, in reply, said that Mr. Millard had pointed out that the plan in old work was very much more than the plan in modern work. Usually the plan in modern work had all been worked out at one time, and was the product of one mind; but in the plan of old work they were usually face to face with an archæological problem; and if they went to a building simply with the idea of making a drawing of it, and if they ignored all the little indications in it of its history, they were acting in the most foolish way. The building was, so to speak, wanting to tell them the secrets of its existence, and if they turned away their attention and were content with a sketch of the profile of one detail or other, they were neglecting an opportunity. In the study of a plan of an old building, the student was, if he was an intelligent person, at once led to the history of that building, and also to the social life of the time and many other things. The study of an old building, if rightly carried out, involved the study of history and social conditions of the time. As to whether a student ought to begin to make drawings only after he had studied a building, he did not think the making of a drawing excluded contemporary study of a building. It was quite true that a student who was just feeling his way would have to give a great deal of attention to his draughtsmanship. If he did not, he would never make much progress, for draughtsmanship took a lot of time at the start; but if he got into the habit of thinking that draughtsmanship was everything, and concentrated all his attention on his drawings and did not from the first also consider the building he was drawing, it was probable he would not do so later on, for he would not get into the habit of doing so. As to perseverance, that was a quality Mr. Mitchell had a right to speak about, for he remembered how Mr. Mitchell made six drawings of a cast at South Kensington before he got his drawing right; the sixth drawing was very different from the first. As to whether the old architects sketched buildings, he must answer distinctly in the affirmative. There was Vasari's independent description of the journey of Velasquez and Donatello to Rome. They were dumbfounded with astonishment when they saw the buildings there, and they became so enthusiastic that they measured up right and left and made most elaborate drawings. Of course, Palladio and Peruzzi made drawings, and there was the sketch-book of Honnecourt. There was internal evidence that they made drawings in the days of Augustus Cæsar, and Vitruvius gave rules of proportions of all kinds. When one saw a system like that reduced to writing, it probably meant that at some previous period the buildings themselves were studied and the laws of proportion of the buildings arrived at. That seemed to involve the measuring up of columns in order to arrive at the heights and proportions of the buildings of what Vitruvius called the "ancients." It was almost necessary, if any one was going to design in any recognised traditional style, to study what had gone before.

The Chairman announced that the next meeting would be held on January 9, when Mr Andrew Oliver will read a paper on "Old London: being Notes on Whitehall and the Strand," illustrated by old engravings and lantern slides.

The meeting then terminated.

THE ARCHITECTURAL ASSOCIATION

DISCUSSION SECTION.

AT the fourth sessional meeting, held at the Association rooms in Great Marlborough-street on Wednesday, the 10th inst.—Mr. Geo. H. Smith, Chairman of the Section, presiding—Mr. J. Sylvester Blunt read an interesting paper on "Crosses, Pagan and Christian," illustrated with a number of diagrams prepared by himself, and with a collection of lantern-slides. Treating first with the history of the Pagan cross, the author dealt with the forms found among the Egyptians, Assyrians, Etruscans, Tartars, Mexicans, Scandinavians, Indians, Chinese, and other Pagan nations, as well as with the Greek "Stauros."

Next, regarding the legendary history of the Christian Cross, the author traced the Eastern and Western forms of this through the Greek form (probably the most ancient), the Latin (known as the *crux capitata* or *immissa*—the form adopted in our own symbolism as referring to the Passion of our Lord), next the *crux ansata* or *commissa*, the well-known Tau cross. The legend of the discovery of the true cross by Helena, the mother of Constantine, A.D. 326, together with references from St. Cyril, St. Ambrose, Rufinus, and others, was next given at length.

In the next section of the paper, the Early Christian Symbolism, the author gave some good examples of Christian work in early times, embodying the cross, as at Westminster Abbey, where an example, apparently dating from the end of the third century, was found in recent times; another from Frampton, Dorsetshire, where there is a Romano-British pavement; from Chedworth, in Gloucestershire, and from Harpole, in Northants.

The Chi-Rho monogram was then carefully explained, together with the various modifications that occurred in later times. This was adopted by Constantine in 312 A.D., and was generally used in Gaul and other countries until 493, as indicated by pillar stones and others with inscriptions. But remaining English examples, as at Jarrow, indicate that here its use was more extended, nearly into the eighth century, being most prevalent from the fourth to the sixth centuries.

The large group of Celtic monuments was carefully analysed, and dealt with under two main heads, (*a*) the rude pillar stones, mostly rough unhewn monoliths, and (*b*) the sculptured stones, which were more carefully worked. The former were all undated, and were incised with crosses, being devoid of all other ornament. About thirty examples remain. Of the class with crosses, but without inscriptions, the late Mr. Rolt Brash thought these were Pagan stones used afterwards by the Christians when the new religion had begun to spread over the land. The sculptured stones, unlike the rude pillar stones, were carefully worked and shaped, most finely dressed and elaborately carved, and generally authentic as to date. The remarkable collection at Clonmacnois was quoted, eighty-one of which have been dated, and found to range from 628 A.D. to 1273 A.D. Other similar ones in Northumbria were described, as the ones at Bewcastle, Collingham, and Ruthwell (of the seventh centuries), Hackness (of the mid-eighth century) the Isle of Man crosses, 888 A.D. to 1226 A.D. (during the period of the Scandinavian occupation), and many others were presented.

Of the various forms of crosses Mr. Blunt then gave a series of lantern slides, chiefly from the Celtic sources, but including the Latin, Maltese, and other forms; the memorial crosses, as those to the memory of Queen Eleanor, 1291 to 1294, and the Percy Cross, to commemorate the Battle of Hedgeley Moor 1464; the churchyard crosses; preaching crosses; gable and altar, and processional forms; and, finally, the market crosses.

Mr. F. C. Eden opened the discussion that followed, and moved a hearty vote of thanks to Mr. Blunt, which was warmly supported by the succeeding speakers on the subject—Messrs. Geoffrey Lucas, N. F. Barwell, C. Tucker (visitor), H. G. Collins, J. A. Bond, E. J. Prest (visitor), and the Chairman, Mr. G. H. Smith. The vote was carried by an acclamation, and Mr. Blunt briefly replied. The Special Visitor for the evening, Mr. E. Swinfen Harris, was unfortunately prevented from being present by illness, but a letter was read by the honorary secretary explaining and apologising for his absence.

The arrangements for the joint meeting of the Discussion Section with the Architectural Association Camera and Cycling Club, on the 17th inst., were announced, when Mr. Francis Bond, M.A., promised to read a paper, illustrated with the lantern, on "English Mediæval Capitals." On January 7, 1903, Mr. J. H. Pearson will read a paper on "Some Points in Ancient Light Practice."

THE ROYAL ARCHITECTURAL MUSEUM:

TRANSFER TO THE ARCHITECTURAL ASSOCIATION.

AN extraordinary general meeting of the Royal Architectural Museum and Westminster School of Art was held on Friday last week at the Museum, Tufton-street, Westminster, to carry into legal effect the arrangement agreed upon between the Museum authorities and the Architectural Association for the transfer to the Association of the leases of the Museum buildings and the collection of architectural examples stored therein. The chair was taken by Sir William Emerson, President.

The notice convening the meeting and the minutes of the last meeting having been read, Mr. Winckworth read the agreement which had been entered into relative to the transfer.

The Chairman briefly explained the motives by which they had been actuated in handing over the Museum to the Architectural Association, in the hope that, in the first place they would thus best secure the perpetuity of the museum and its valuable collection to be freely open to the public as heretofore; and, in the second, would bring the museum into closer connexion with the architectural profession, and especially students of their noble art, and thus greatly enhance its usefulness. Their only regret was that, as a necessity incident to the change, they would displace the Westminster School of Art, which had attained a high and

deserved reputation, the accommodation which the premises afforded being required for the work of the Association and its architectural classes. Sir William then formally moved that the common seal of the Royal Architectural Museum and Westminster School of Art be affixed to the agreement which had been read by the honorary solicitor.

Mr. Seth-Smith seconded the resolution, which was carried unanimously.

The Chairman then moved that the Royal Architectural Museum and Westminster School of Art be wound-up voluntarily, and that Mr. Wm. Pain be appointed liquidator for the purpose of such winding-up.

Mr. Aston Webb seconded the resolution, which was also carried unanimously, and it was decided that the meeting for confirming this resolution should be held on January 16 next, in conformance with the statute.

The President said that, having transacted the formal business of the meeting, they had a pleasurable duty to perform in recognition of the services rendered to the Museum through a long series of years by Mr. J. P. Seddon and Mr. Maurice B. Adams in their capacity as honorary secretaries. Mr. Aston Webb had been mainly instrumental in connexion with the matter, and he therefore called on him to make the presentations.

A pair of silver bowls, with appropriate inscriptions, were here placed upon the table, and Mr. Aston Webb, in response to the President, referred to the constant and valuable services of their old friend, Mr. Seddon, extending over half a century, and of Mr. Adams, who had acted as hon. Secretary, first in conjunction with Mr. Seddon, and in later years by himself for a period of twenty-six years, and to him was chiefly due the scheme of transferring the museum to the Architectural Association, which now approached consummation. He did not recollect any matter of importance which had been carried through with such complete unanimity. He thought, however, that it would be more fitting that the presentations should be made by Sir William Emerson, as their President, and begged him to undertake that pleasant duty.

The President then, in complimentary terms, gave expression to the pleasure which it afforded them to make this slight acknowledgement of long and valued service, and having read the inscriptions on the bowls, handed them to Mr. Seddon and Mr. Adams, on behalf of the subscribers.

THE DETECTION AND PREVENTION OF UNDERGROUND POLLUTION.*

THIS subject has been before the Association on several occasions, particularly in the paper contributed by our Past-President, Mr. Matthews, at the winter meeting of 1900. The ground was also partly covered by Mr. Watts in his paper presented at the Birkenhead meeting last year. Mr. Watts, however, confined his remarks to supplies derived from moorland gathering grounds, and concluded with a request that some other member would take up the subject of the pollution of springs and well supplies. The author has in the present paper attempted to comply with this suggestion.

As the primary source of all water supplies is the rainfall, it can hardly be said that there is any essential difference between "surface" and "subterranean" water. Rain, when it falls upon the earth, pursues, under the action of gravity, the easiest route from the point where it fell to the sea (from which it was originally derived), or other natural outlet, and there is, therefore, at all times a large quantity of water travelling underground as well as upon the surface. The former may appear at some spring, or may be intercepted by a well, just as certainly as a stream may be intercepted above ground. The laws which govern the yield of wells and springs are fairly well understood by waterworks engineers; but even so, it is always necessary to examine the nature of the strata and the depth of the water line below the surface before deciding upon the diameter or depth of the well or borehole, and even with this knowledge, difficulties of observation, and consequent ignorance of facts as to the underground watershed, often make it an impossibility to forecast the yield of any given well.

A similar uncertainty exists in regard to the pollution of underground water. In water supplies furnished by streams or rivers which drain impervious gathering grounds, the whole course of such streams is open to the light of day, all sewers or drains from farmyards, &c., any sheep-washing, or other acts likely to pollute the water can be observed, and it is only by some wilful or careless act that a stream can be polluted. On pervious soils, more especially in the neighbourhood of large towns, such safeguards do not exist, and we are startled every now and then by some epidemic of typhoid being traced to some source of water supply which a few weeks previously had been "like Cæsar's wife—above suspicion."

Underground water, mainly owing to its more intimate contact with the various mineral substances which form the earth's crust, generally contains a much larger amount of dissolved mineral substances than river or upland waters. These impurities, chiefly lime and magnesia, and sometimes iron, unless in excess, are rarely considered detrimental to the use of the water for dietic purposes, although for washing and manufacturing purposes they prove somewhat objectionable; but processes exist, mainly modifications of that discovered by the late Professor Clark, which remove to a great extent the hardening matters in solution.

In some districts, more especially near the sea, deep wells yield salt or brackish water. This may arise from two causes: the first, as in some New Red Sandstone districts where there are beds of salt in the formation, or in flat alluvial-covered districts where the sea has covered the surface in comparatively recent times; in the other case, wells sunk in the first instance to intercept water flowing towards the sea have been pumped too heavily, with the result that the direction of the flow has been reversed. As regards the first case, it is waste of labour to attempt to obtain water fit for domestic purposes from salt-bearing beds. In some parts of Lincolnshire the best water lies on the top of the chalk, the water below being more or less brackish, while in the Fen district many wells which when first sunk yielded salt water, have, by persistent pumping, come to yield a fairly fresh water in ordinary seasons, such supplies falling off in quantity and turning brackish in seasons of drought. The engineer who uses sea sand for filtering purposes will have some idea of the persistency with which a certain amount of salt is retained in the filter-bed for weeks at a time. In one district whose supply contained on an average 70 grains per gallon of common salt some twenty-five years ago, the amount is to-day less than one-third of this quantity, although the author is informed by residents that the water tastes of salt more strongly after a heavy rainfall. In the second case the water when first struck is generally at a somewhat higher level than the mean sea level, and where the works are situated on high ground and the friction caused by the closeness of the strata very great, the water is quite fresh, although the yield of the well may be small. Where, however, a long stretch of level land lies between the gathering ground and the sea the "hydraulic gradient" is flat, and in many cases the rise and fall of the tide produces a corresponding rise and fall of the water-level in the wells. A well which intercepts a large volume of water flowing from the gathering ground to the sea would, no doubt, yield fresh water, but if the gathering ground was small, and in seasons of drought such a well might easily be too heavily pumped, with the result that the direction of the flow might be either permanently or intermittently reversed, and salt or brackish water obtained. Moreover, when once sea-water has made its way into a well, it is almost hopeless to prevent future percolation from this source, and the plan of pumping from a higher level and reducing the quantity drawn from the well is then the only course to take. Even this, however, is not always effective. Although most wells affected in this manner are situated near the sea or on a tidal stream, cases have been known to occur as far as seventeen miles distant from the sea.

Underground waters are, however, generally free from detritus and mineral matter in suspension, although in the neighbourhood of "swallow holes," or where a bed of gravel adjacent to a stream is pumped from, the water will possibly become turbid after heavy rain. The systematic manner in which the French "engineers of bridges and roads" have dealt with the springs in the watershed of the Eure, which have been utilised for the supply of Paris, forms a capital object-lesson for water engineers in this country.

But if underground water is usually more exempt from matters in suspension, and also from vegetable organic impurity as compared with surface supplies, it is much more liable to unseen pollution, direct or indirect. In the case of surface (lake or river) water, pollution can only take place by the direct discharge of sewage into them, the manuring of land within the drainage area, and the storage of manufacturing and domestic refuse, all of which can easily be seen, and—with ordinary care—prevented. With underground water, cesspools, leaky sewers, and even sewage farms are sources of danger which may exist for years unnoticed, and very often when the danger is pointed out the man who sounds the note of warning is called a faddist—or something worse—and nothing is done until an epidemic occurs. Then, of course, an inquiry is held by the superior powers, and a great outcry is raised; but surely this is locking the stable door after the horse is gone. The writer has known cases where a well has been sunk to procure clean water, and afterwards a cesspool has been constructed to get rid of the dirty water in such a position that as soon as the cesspool filled up, the contents immediately found their way into the well, and the water naturally became impregnated with organic impurities of the most dangerous character. In another case the position of the cesspool being unknown, a well was sunk within 3 ft. of it. In a third case, an old well was used for the water supply of some new cottages, situated some little distance away, and the water was conveyed through a pipe to the pump, which was fixed in a convenient position near the cottages. Some years afterwards, in order to keep the well water from contamination by surface drainage, a gutter was constructed to drain the surface water away from the cottages. It was afterwards ascertained that this soaked into the ground almost directly above the well the gutter was formed to protect. In all three cases it was not until serious illness had occurred in the houses that an analysis of the water was made and an inquiry was ordered, which revealed the actual state of affairs. In another case, the suburbs of a town situated on the New Red Sandstone was supplied, until the erection of waterworks, entirely from private wells. The Corporation then, however, sunk a well from which the supply of the whole neighbourhood was obtained, with the result that the water level was permanently lowered and the private wells emptied. Water being then laid on from the Corporation mains, and there being no system of drainage, the owners very naturally converted their wells into cesspools, from which the sewage found its way into the waterworks wells and was believed to have caused a serious epidemic. This well, having also affected the yield of another well belonging to the same Corporation some three miles distant, was temporarily closed, and on pumping being resumed some months afterwards, the water level in the well was not allowed to fall below that in the neighbouring wells, and a complete system of sewerage was carried out at the same time.

Even when sewers are made with the greatest care they are not always watertight, and in some cases large quantities of spring water find their way into them, and there is no reason to doubt that, were a fall in the underground water level to take place (from exhaustive pumping or otherwise), the direction of the flow might be reversed from the sewer to the subsoil. Water will also undoubtedly travel along the side of a sewer for long distances. Some thirty years ago a main sewer in a district south of the Thames was constructed by the late Metropolitan Board of Works some 100 yards from a well from which 1½ million gallons per day were being pumped. Periodical analysis of this water showed a gradual increase of chlorine due, no doubt, to percolation from the sewer, and as a result the well had to be abandoned and the engines and boilers removed. Mr. C. E. De Rance, in a paper read at our Nottingham meeting, instanced a case where a sewage farm was laid out in permeable strata close to a waterworks well. The pollution in all these cases revealed itself in the analysis by an increase of the organic matter in solution.

* A paper read by Mr. John Shaw at the recent London meeting of the British Association of Waterworks Engineers as mentioned in our issue for December 13.

"Norwood," Huddersfield. Plan.

The obvious remedy for such an unsatisfactory condition of affairs as has been instanced by the examples above quoted is to rigorously exclude every possible source of pollution, to insist on the closing of all cesspools in the neighbourhood of the source of supply, and to see that all shallow wells are constructed on the principles advocated by Mr. J. Dewhirst in his paper read at the 1901 meeting of the Sanitary Institute. The chief precautions to be observed are: buying a "protective area" round pumping-stations; lining deep wells with iron tubing for a considerable depth below the surface; boreholes should have their upper portions securely lined, and where they start from the bottom of wells, concrete floors should be constructed, so as to make a watertight joint round the upper bore-tubes, and thus prevent any surface water gaining access to the boring or well. The variations of the water level in wells and boreholes due to either natural causes or to pumping should be carefully noted, as well as the quantity of water drawn in each case, and observations should be carefully recorded showing the effect of such pumping on any springs and wells in the neighbourhood. Analyses of the water should be taken at frequent intervals, especially when heavy rainfall follows a long drought and causes a rise of the water level.

One word, in conclusion, on another important point. Deep-well water may be organically pure in consequence of its having been slowly filtered through deep-seated rocks, which have oxidised the impurities it contained when it passed through the surface of the earth, and, generally speaking, underground water is free from the innumerable micro-organisms which infest all surface water; but it must be remembered that the relative danger or value of these germs is still a disputed point with scientists, although there can be no doubt that certain groups are typical, and possibly productive of typhoid fever and other zymotic diseases; we are also assured that such organisms exhibit a more marked vitality in sterile deep-well water than in surface water of more doubtful purity. The waterworks engineer, aided by some simple chemical tests, can do a great deal in the direction the author has indicated, but he is utterly powerless to deal with organisms so minute that many millions may exist in a space of three-eighths of an inch cube, and of which 25,000 placed in a line would only represent 1 in. in length. Here the aid of the bacteriologist must be invoked, but at the same time the engineer should at least take reasonable precautions to preserve the well or boring from contamination, such as may often arise from the clothing, and especially the boots, of workmen employed in them. The author also considers it essential that on no account should water from deep wells be exposed to light or air until it is drawn from the consumers' taps. He is also inclined to advocate the filtration of *all* water supplies, whether derived from the surface, the subsoil, or deeper seated sources, but in this no doubt his views may not be shared by all at present, as there is a difference of opinion as to whether even surface waters all require filtering; and, in advocating the filtration of bright clear water drawn from the chalk, or the New Red Sandstone, he is conscious that he will be considered somewhat in advance of his times.

BUSINESS PREMISES, NEWCASTLE-ON-TYNE.—New buildings for Messrs. W. Glendenning & Sons have been erected in Blackett-street, Newcastle. There are seven stories in the building, and an electric lift will convey people up to any floor. The first floor will be occupied by the firm, and the other parts utilised as offices. Messrs. Marshall & Tweedy are the architects. The building operations were carried out by Mr. T. Lumsden, contractor, Jarrow, and the fitting up of the premises has been done by Messrs. Robson & Sons, Newcastle.

MISSION HALL, SOUTH SHIELDS.—A new mission hall, built to accommodate 600 people, was opened recently at the corner of Alice-street and Bertram-street, South Shields. Mr. H. Grieves was the architect, and the building work was carried out by Mr. James Young.

Illustrations.

THE ANGEL APPEARING TO THE SHEPHERDS.

THIS is a reproduction of a cartoon by Mr. N. H. J. Westlake for a panel which forms a portion of a triptych in St. Paul's, Wilton-place, Knightsbridge. It illustrates the sentence, "Behold, I bring you good tidings of great joy."

The centre compartment of the same triptych was illustrated in the *Builder* of May 30, 1891.

ORLEY FARM SCHOOL, HARROW.

THIS is a preparatory school for small boys, and has been planned and arranged specially for this purpose. The conditions are somewhat different from the ordinary school buildings, the supervision being greater and the staffing upon a more considerable scale. Future extension accounts in some measure for the unsymmetrical arrangement. The building, which is of red brick and tile, has only recently been opened—the school having removed, under the head-mastership of Mr. S. B. Innes Hopkins, from Antony Trollope's old house, Orley Farm, which is close by. The contractors were Messrs. Jas. Smith & Sons; and the architect, Mr. Arnold Mitchell.

THE MATTISON-ROAD SCHOOLS, HARRINGAY.

THIS design was placed first by Mr. E. R. Robson in the recent competition, and the school is now well under weigh, with practically no variation from the competition design. The materials are red brick and red terra-cotta, with tile roofs. The buildings provide accommodation for a very large number of children, and there are five separate blocks, one block being a higher elementary school to serve the whole district. Cookery school, manual instruction-room, laundry, and swimming-bath form a very useful technical block. Messrs. McCormick & Son are the contractors, and the joint architects are Mr. Arnold Mitchell and Mr. Alfred Butler.

MEMORIAL LIBRARY, DULWICH COLLEGE.

THIS building is in course of erection in the grounds of Dulwich College as a memorial to Old Boys who fell in the recent South African war. It has been subscribed for principally by Old Alleynians and other friends, the College Governors, and Alleyn Club, having given substantial donations.

The library is divided into two parts, the larger for the use of the boys generally, the other for the prefects and senior boys of the College. The main hall has a barrel vaulted ceiling, groined over the windows, with ribs at each principal; the smaller room is covered with a dome surmounted by a small lantern. The window sills are about 7 ft. 6 in. above the floor, and beneath the sidewalls are covered with bookcases, the end walls being panelled to receive memorial brasses. The entrance porch is also domed.

The building is externally of red bricks and Portland stone. There will be sculptural figures on each side of the north gable, and over each angle buttress of the south apsidal end. The domes, which are covered with lead, will be terminated by metal statues. The flèche is of teak, with lead roof. The floors are of polished teak; the doors, bookcases, and panelling of fumigated oak. The walls and ceilings are of plaster, and it is hoped that parts will be decorated with frescoes by some of the eminent painters who are old Alleynians.

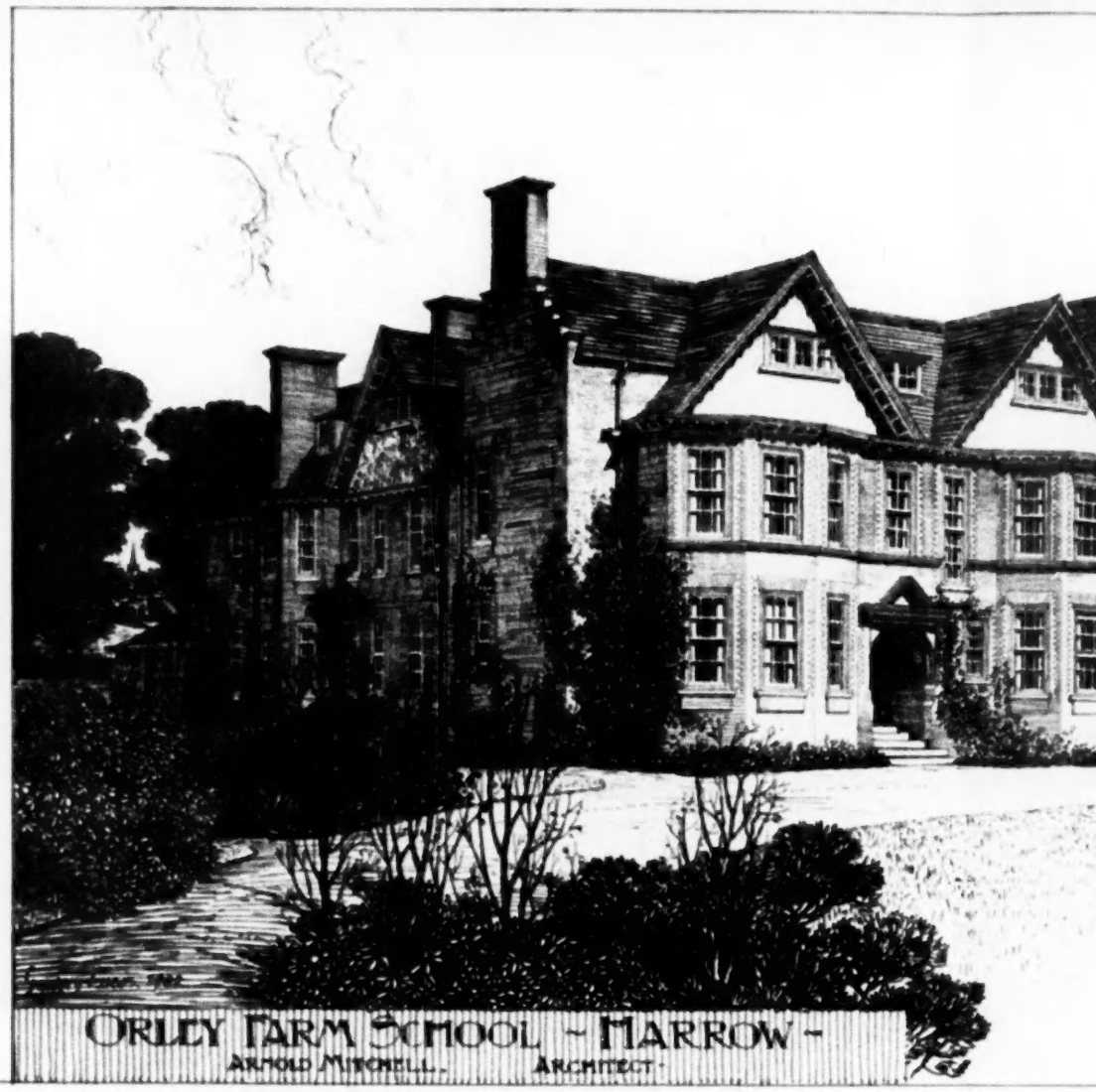
The contractors are Messrs. Holliday & Greenwood, and the architect is Mr. Edwin T. Hall.

"NORWOOD," HUDDERSFIELD.

THE house occupies a very fine position on high ground in a well timbered park, and has been erected for Mr. J. H. Kaye. The exterior is faced with York stone, the roofs are faced with Broseley tiling. The hall is panelled to a height of 10 ft. with oak, with a carved mantel and overmantel, the ceiling being divided into panels by oak beams carried by fluted pilasters. The dining-room is also oak panelled with oak mantelpiece, the ceiling

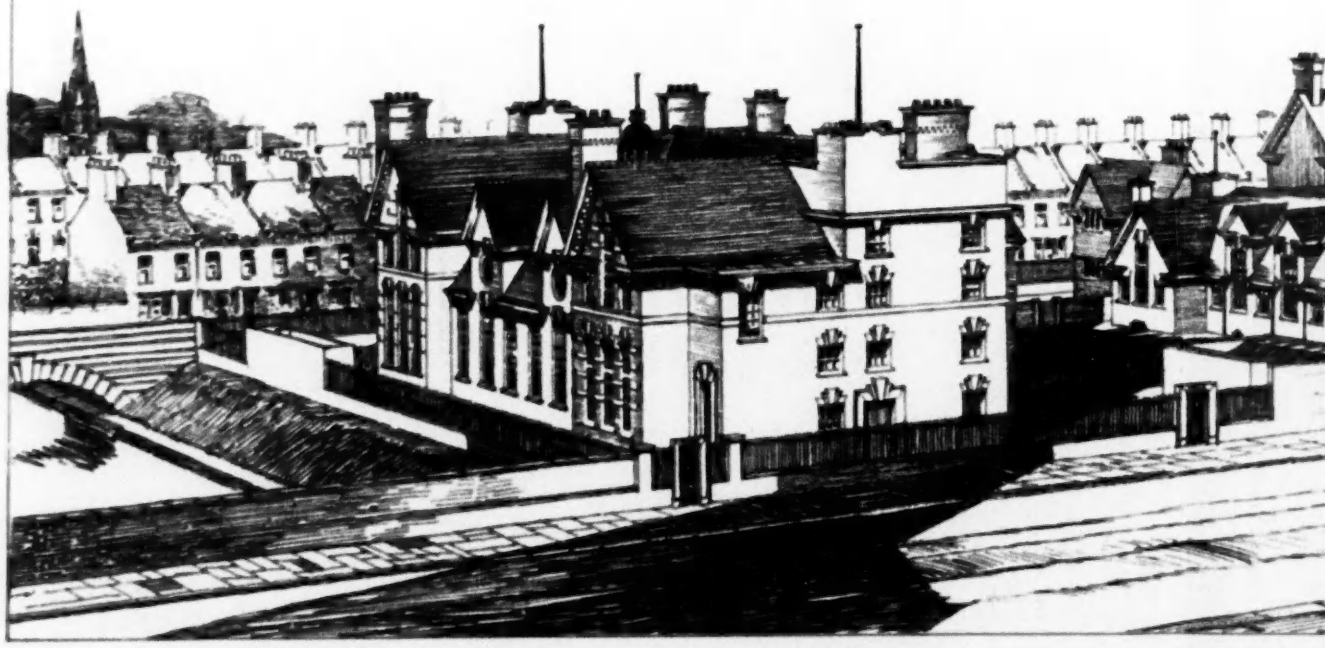
INS. PHOTO SPRAGUE & CO. LTD. 4 & 5 EAST HARDING STREET FETTER LANE E.C.

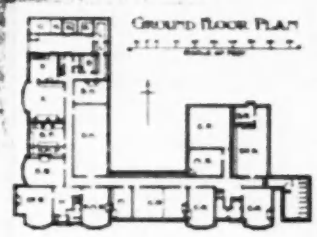
THE ANGEL APPEARING TO THE SHEPHERDS.—From a Cartoon by Mr. N. H. J. Westlake, F.S.A.



ORLEY FARM SCHOOL - HARROW -
ARNOLD MITCHELL. ARCHITECT.

: MATTISON ROAD SCHOOLS :
: FOR THE HORNSEY SCHOOL BOARD :
: ARNOLD MITCHELL. : ALFRED BUTLER. } JOINT ARCHITECTS.





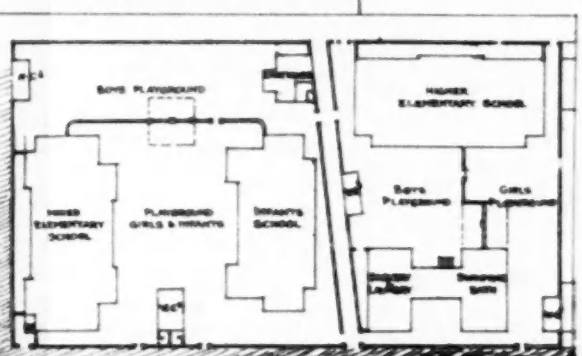
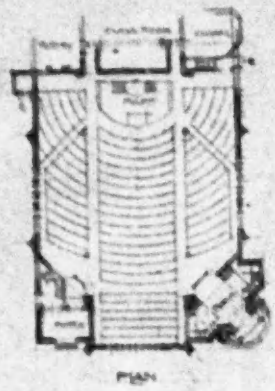
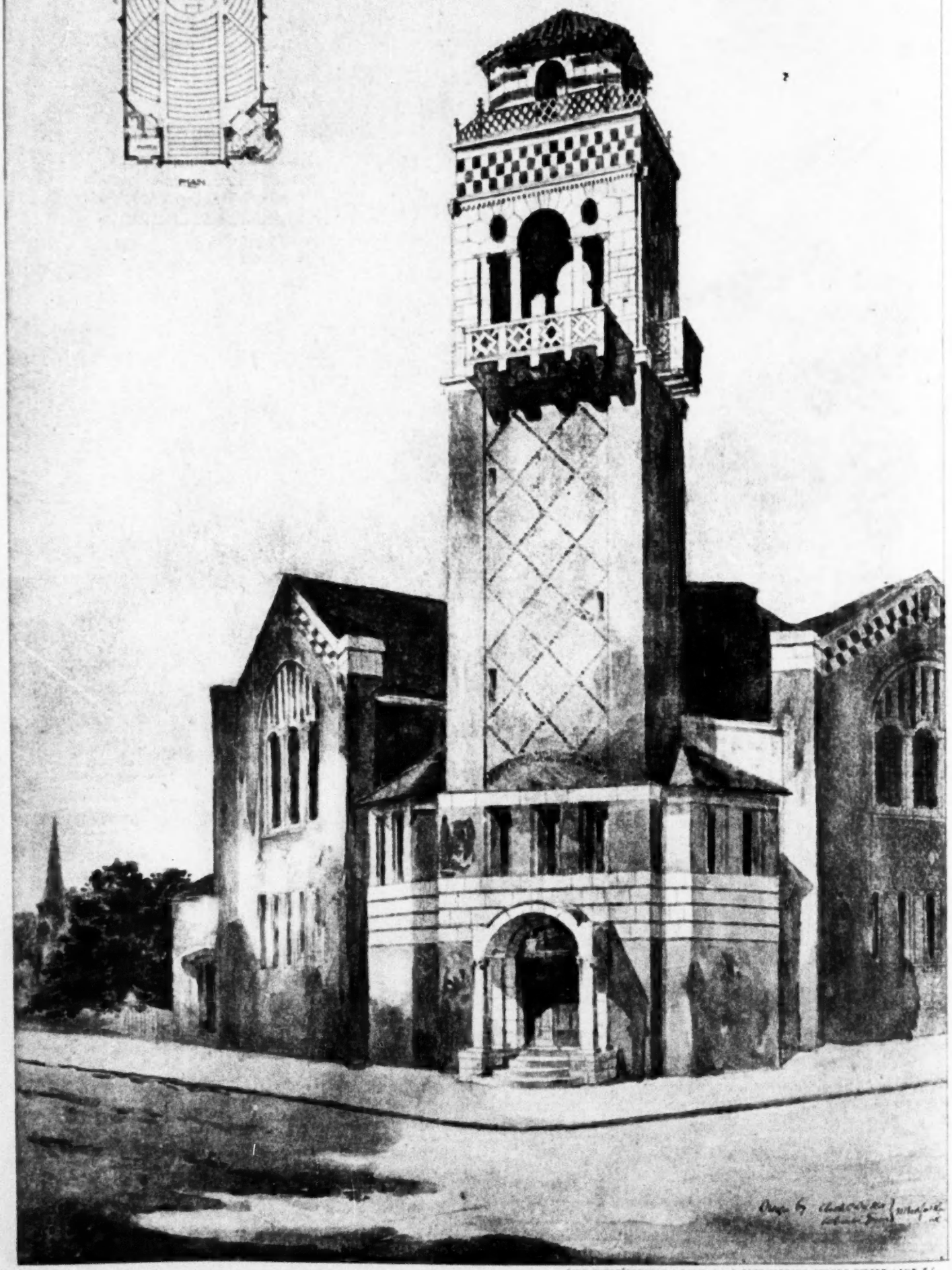


PHOTO LITHO SPRAGUE & Co LTD 4 & 5 EASY HARDING STREET, FETTER LANE, E.C.

MUSWELL HILL PRESBYTERIAN CHURCH COMPETITION



PLAN



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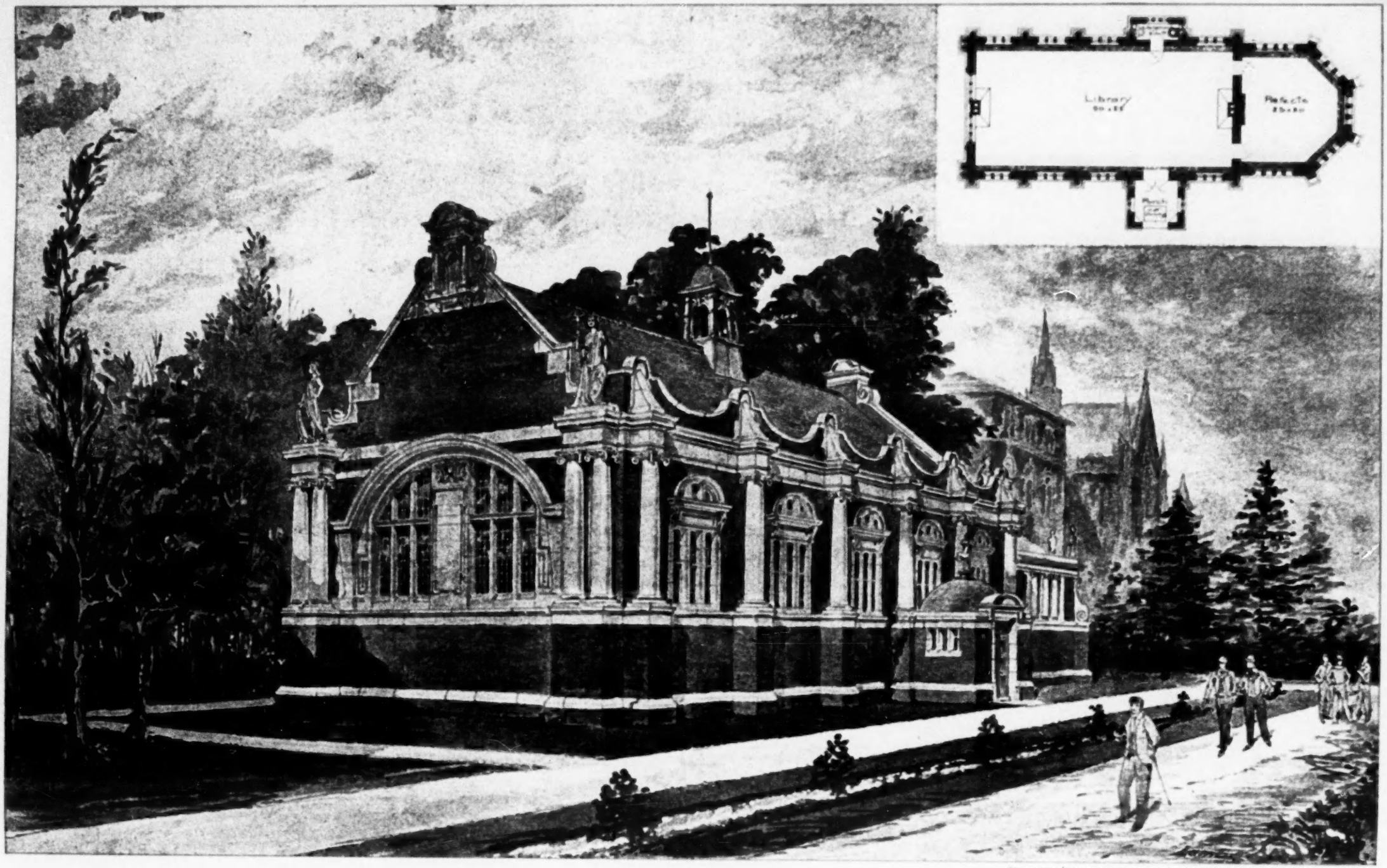
COMPETITION DESIGN FOR PRESBYTERIAN CHURCH, MUSWELL HILL.—By Mr. Arch. C. Dickie & Mr. W. Curtis Green



MEMORIAL LIBRARY, DULWICH COLLEGE.—MR. E. T. HALL, F.R.I.B.A., ARCHITECT.

THE BUILDER. DECEMBER 27, 1902.

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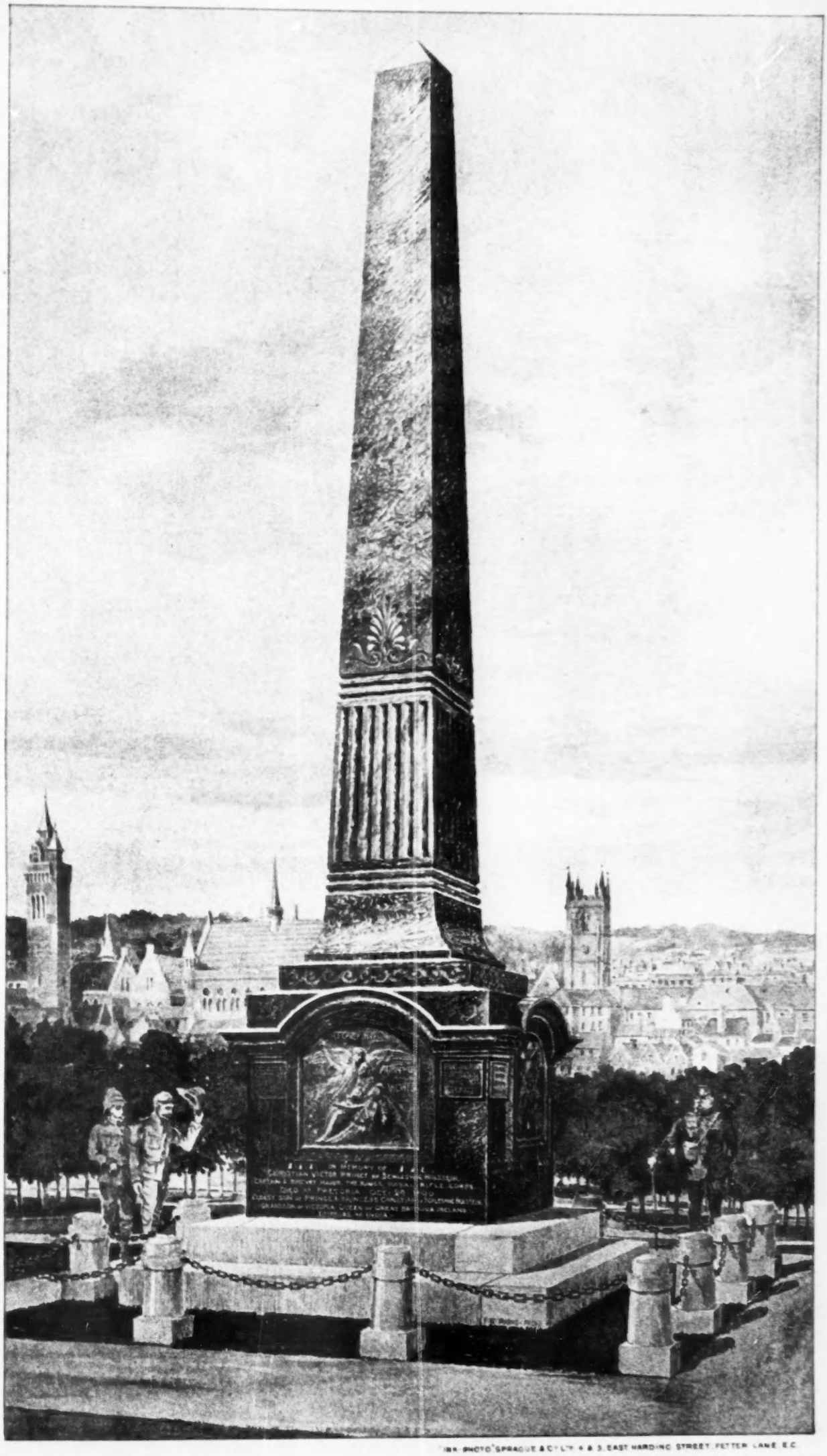
"NORWOOD," HUDDERSFIELD.—Mr. J. Hatchard Smith, F.R.I.B.A., Architect



MEMORIAL ON THE HOE, PLYMOUTH.—Mr. F. W. Marks, A.R.I.B.A., Architect.

of fibrous plaster with projecting oak beams. The morning-room has mahogany dado screen and bookcases and mantelpiece, with plain ceiling and enriched cornice.

All the woodwork to drawing-room is finished with white enamel, the ingle nook, ceiling, and decorative work being in fibrous plaster, all finished white. The whole of the woodwork in billiard-room, including screen and mantelpiece, is of fumigated oak; the ceiling, which is arched, is of fibrous plaster divided into panels by oak ribs carried on brackets. The staircase is of oak. Mrs. Kaye's bedroom has specially-designed fitments, all in inlaid mahogany. The floors of all reception-rooms and hall are of solid oak parquet. The vestibule, loggia, and conservatory have marble mosaic paving. The whole of the walling, including entrance lodge, was carried out by Messrs. Mallinson & Sons and Mr. Bottomley, the carpenter's work being done by the estate workmen. Messrs. Burt & Potts supplied the iron casements. The whole of the work was designed and carried out under the superintendence of Mr. J. Hatchard Smith, architect, of London. The grounds were laid out by Messrs. Milner & Sons.

DESIGN FOR PRESBYTERIAN CHURCH, MUSWELL HILL.

THIS was an unsuccessful competition design for a Presbyterian church, but we are glad to publish it for the pleasing and picturesque treatment which it shows. It may be admitted, perhaps, that the upper portion of the tower hardly suggests a Presbyterian church; it has too Oriental a feeling for that.

The design is by Messrs. A. C. Dickie and W. Curtis Green.

WAR MEMORIAL ON THE HOE, PLYMOUTH.

THIS memorial, of which the foundation-stone was laid by Lady Butler on August 4, is erected to the memory of Prince Christian Victor and of the officers and men of the Somersetshire, Gloucestershire, and Devonshire Regiments who fell during the Boer War.

The monument, which is of granite, is 41 ft. high. The steps and enclosing pillars are of gray granite. The canopied base, 8 ft. high, of green granite, contains a bronze commemorative panel about 4 ft. 6 in. by 3 ft. 6 in. on each face. The one to the Prince is the work of Mr. Emil Fuchs. The others represent memorable battle scenes, and with the inscription are all by Mr. Onslow Whiting. The shaft is of red granite.

The general design is by Mr. Fred. W. Marks, architect, of London. The contractors for the work are Messrs. Fenning & Co. (London).

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Mr. Thomas W. Aldwinckle, London, delivered a lecture on the 17th inst. to the members of the Edinburgh Architectural Association on the erection of isolation hospitals in times of emergency. Mr. A. Hunter Crawford presided. The lecture was for the most part a description, illustrated by plans, of the hospitals erected in connexion with recent epidemics in London. In the course of some general introductory remarks, the lecturer described the general methods of building a hospital under pressure of an epidemic, such as the Metropolitan Asylums Board had to contend with this year. In order to build a properly equipped infectious hospital in a few weeks, the ordinary procedure, he said, would be quite out of the question. There was no time for elaborate plans, for bills of quantities, or for inviting tenders by advertisement. The architect selected should be thoroughly conversant by previous experience with this class of work, and it was equally important to have an expert and trustworthy builder. As there was no time to enter into a contract for a fixed sum, the amount to be paid to the builder must be based upon a schedule or left for valuation. There was one important question which arose in connexion with these emergency hospitals about which there was considerable difference of opinion—whether the buildings should be made of as permanent a character as possible, consistently with speed of erection, or be "knocked up," so as to last a short time, and be afterwards pulled down. Much depended on the circumstances of the case. The cheaper method of building was considered advisable by some on the grounds, firstly, of economy, and, secondly, on the ground that the sooner an infectious building was destroyed, the better. As to the latter, there were now no difficulties in the way of thoroughly disinfecting a building; as to the former, he doubted whether it was a true economy. Personally, he was strongly of opinion that the truest economy was to erect those emergency hospitals in as permanent a way as would be consistent with a high rate of speed. It might be taken for granted that if the isolation hospital was wanted at the present time, it would be wanted in the future, and if such be the case the permanent construction was the truest economy. It should also be borne in mind that the whole of the sanitary arrangements must be good, and consequently expensive, and that all these would be practically wasted in a merely temporary building. Referring to the details of construction, he advocated a good platform of cement for the whole building; the walls and partitions of fir quartering, with the outer walls covered with diagonal boarding, felt, and corrugated iron. The roof, which should be of the ordinary timber construction, should also be covered with diagonal boarding, felt, and corrugated iron. The internal finishings were also described in detail. He did not, he said, admit the principle of a second quality in sanitary work. The patients were just as ill in a temporary as in a permanent hospital, and required the same advantages of perfect sanitation. The same remark applied to warming and ventilation. It was preferable to warm by means of open fireplaces, supplemented by low-pressure hot-water or steam apparatus. It took some time to build brick fireplaces, and sometimes this was not practicable, but a great effort should be made to provide these, as an open fireplace was, after all, about the best exhaust ventilator that could be found. It was of vital importance that, as emergency hospitals were somewhat more inflammable than an ordinary permanent hospital, very complete and adequate fire-extinguishing appliances should be provided, as also a complete system of fire alarms. In concluding, Mr. Aldwinckle gave particulars of an emergency hospital of 612 beds he had erected this year for the Metropolitan Asylums Board, together with its administrative staff quarters and administrative buildings at Gore Farm, near Dartford. His firm was instructed on January 9. It was arranged (in case of fresh developments of smallpox) that the new hospital should be opened in stages as completed, so that no time should be lost. The boiler-house, laundry, and kitchen were ready on February 22, the ten temporary ward pavilions a week later, the administrative block on April 7, the six staff homes and eleven ward pavilions on April 21, and the remainder of the hospital on May 3. The number of men employed was 2,600; 6,000*l.* was spent in providing sleeping huts for some 1,100 men, and about 1,200*l.* in having them vaccinated, and in other incidental expenses, the new hospital being close to one that was full of smallpox patients. The erection of isolation hospitals in times of emergency was very costly. That such emergencies should occur demonstrated the extreme difficulty of accurately estimating the margin to be allowed in the provision for infectious diseases, and more especially in the case of smallpox, the course of which was most erratic. This applied alike to large and small communities, and as these emergencies were not only possible, but probable, it would always be useful to understand the best methods by which to grapple with them, and thus prevent an outbreak from developing into an epidemic, a result which the Metropolitan Asylums Board had fortunately been able to achieve in connexion with the visitation of smallpox in London during the present year.—In the course of the evening the services of Mr. Thomas Fairbairn, who had been hon. secretary for twenty years, were acknowledged by a presentation, which was made to him, by Mr. Thomas Ross, on behalf of the Association.

A NEW THEATRE IN THE STRAND DISTRICT.—It is stated that Mr. W. G. R. Sprague has been appointed architect by Mr. Murray Carson for a new theatre which the latter intends to build upon a site near the new Gaiety Theatre and Restaurant, which are now being erected in the Strand at the south-east corner of Catherine-street.

ENGINEERING SOCIETIES.

THE INSTITUTION OF JUNIOR ENGINEERS.—At the meeting of this Institution, held at the Westminster Palace Hotel on December 12, the chairman, Mr. Kenneth Gray, presiding, the paper read was on "A New Automatic Railway Coupling Compared with the Existing System upon the British Railways," by Mr. A. T. Swaine, A.M.I.Mech.E., Member. After referring to the Royal Commission Report of 1900 (Prevention of Accidents to Railway Servants), which stated that at the date of issue there was apparently no coupling available suitable for general adoption upon British Railways. The author drew a comparison between the risk of death and injury to shunters with that to a soldier in time of war, showing that the former were 24 times more likely to meet with death or accidents as were the latter from all causes in the late South African War. A short account of the development of the present system followed, and a criticism of its working under various conditions, more especially in the case of the long American type of Bogie waggons, which the author considered were not likely to become generally adopted, unless with a central buffing and drawing gear, as is in use in so many other parts of the world; which should also be automatic to meet the demand of efficiency. The requirements of an efficient automatic system were cited in detail, and reference made to the competition thrown open to the world by the Congress of Representatives of Russian Railways, which is offering prizes for the three best automatic couplings suitable for Russian railways. The new automatic buffer coupler was then described. Called for convenience by its initial letters the A. B. C. system, it was shown to be an exceedingly simple and ingenious piece of mechanism consisting of three parts only, which were precisely alike on both ends of the waggons. To ensure economy in manufacture, it had been designed with the special object of rendering machining practically unnecessary, and was capable of working with the existing side-buffer system during the transition stage; coupling to existing stock was readily effected by means of the pole. The present design of waggon frame was very suitable for the adoption of the new type of coupler with a continuous draw-gear, which would ensure longer life for the waggon and less cost for repairs. The author showed that the conversion could be effected without a large demand upon capital, and estimated that on account of the reduced weight of the new gear and other reasons the advantages of its adoption on British railways would represent about 7½ millions sterling per annum.

COMPETITIONS.

GREENWICH LIBRARY.—In the open competition for the Greenwich Library, Mr. Belcher, the assessor, placed first the design of Mr. Sidney R. J. Smith, of York-buildings, Adelphi, W.C.; and second that by Mr. N. Dinwiddy.

PARK, ST. HELENS.—The first premiated design in the competition for laying out Park, St. Helens, was by Mr. E. Thomas, horticultural designer, Aughton, Lancs.; and the second by Mr. G. Gensel, 184, Boundaries-road, Balham, London, S.W.

LONDON BUILDING ACT, 1894:

IMPORTANT POINT UNDER SECT. 41.

THE Tribunal of Appeal under the London Building Act, 1894, sat at the Surveyors' Institution, Great George-street, Westminster, on Friday last, to hear an appeal by Mr. Harold Walduck, under Section 41 of the Act, against the following resolution of the London County Council, passed on December 2:—"That the Council, in the exercise of its powers under Part V. of the London Building Act, 1894, do not allow a modification of the provisions of that part of the Act with regard to the proposed erection of a building to be known as Nos. 83, 85, and 87, Southampton-row, Holborn, with an irregular open space at the rear and portions of the building to extend above the diagonal line directed by Section 41 of the Act to be drawn, as shown upon the plans submitted with the application of Mr. C. F. Doll, on behalf of Mr. H. Walduck."

The members of the Tribunal sitting were Messrs. J. W. Penfold, A. A. Hudson, and E. A. Gruning.

The case for the appellants was conducted by Mr. W. F. Craies, barrister, and the London County Council was represented by Mr. Andrews.

On the plans being submitted to the District

Surveyor the appellant was informed that without special permission from the Council the building as shown would, under Section 41, be irregular. The appellant therefore made application to the Council for permission to carry out the work, claiming, in the first place, exemption from Section 41, as principally not applying to public buildings, to which class the present building would belong. In the second place the appellant claimed that the garden ground at the rear might reasonably be regarded as a secured open space. Thirdly, he claimed that the equivalent cubic space for light and air described in Section 41, sub-section 1 (3) was, in fact, provided. Fourthly, the appellant offered to bring his building into conformity with the Act if at any time the open space at the rear should be in any way treated so as to render it no longer available for light and air to this building.

The terms of the application to the Council were that, as the building would, if carried out, extend beyond the diagonal line described in Section 41, permission was asked to vary on the following grounds:—The building contained over 250,000 cubic feet, and was a public building, and was not, therefore subject to Section 41, which referred to domestic buildings, defined in Section 6, sub-Section 26, as "any building not being a public building or of the warehouse class." The garden ground at the rear was the property of the Duke of Bedford, and had lately been laid out by him as a permanent garden, and although his Grace did not covenant that the space would be maintained as an open space for ever yet that was his present intention, and even if at any time the freeholder thought it desirable to build upon the garden ground, it was competent to form a new roadway, and the site would be suitable for a very small block such as studios, &c. Moreover, an open cubic space of air would be provided at the rear equivalent to the open cubic space which would have been provided if the diagonal line had been drawn from the ground level in the manner provided under Sub-section (3) of this Section, and if no part of such building (except as permitted in the preceding provision of the Section) had extended above such diagonal line. The appellant expressed his willingness to covenant with the Council for himself and his heirs, and assigns on notice from the Council to take down forthwith at his or their own expense and without notice at the termination of the present lease—if not renewed—such portions of the building as might project beyond the diagonal line drawn from a point at the rear boundary 16 ft. above the pavement level if at any time the open space at the rear was treated in such manner as should invalidate it from being considered an open space available for purposes of light and air to the building in question

Mr. Andrews, for the respondents, contended that the open space required by Section 41 must be in the rear of the building and extend the whole width of the site, and that the proviso of Sub-section 2, of Section 41, dealing with the equivalent open cubic space to be provided at the rear of such building meant a space at the rear of the building. Therefore, in arriving at what was an equivalent space, that at the side of the building must be ignored. The two spaces, or side courts, in the case before the Tribunal could not, he insisted, be taken into consideration in arriving at the equivalent space provided at the rear. He laid stress upon the fact that the section under the Metropolis Management Act, 1855, dealing with open spaces permitted spaces at the rear or on the side of the building. This section, however, had been repealed, and the provisions of Section 41 of the London Building Act clearly contemplated only the provision of an open space at the rear of a building. He drew attention to the fact that when spaces for lighting were dealt with under Part V they were called courts within a building, and in Section 40 of the Act, which provides for the lighting and ventilation of habitable basements, a special provision was put in that the open space for lighting such basements, notwithstanding anything thereinafter contained, need not necessarily adjoin the rear boundary of the premises. He also dwelt upon the irregularity in the lighting of certain rooms opening into the internal court, and the fact that the portion of the building at the rear had been erected above the 16 ft. level of the pavement. The County Council, he remarked, considered the question of the provision of air-space at the rear was so very important that, in the event of the Tribunal finding that air-space provided at the side of a building was equivalent to air-space provided at the rear, he thought the Council would probably wish to appeal.

After hearing evidence, the Tribunal intimated that they would consider their decision.

CRYSTAL PALACE ENGINEERING SCHOOL.—The "Wilson Premium" for the best Paper read before the Crystal Palace Engineering Society during the present session has been awarded by the Council to C. S. Dowell for his paper on "Torpedoes and Torpedo Craft." Other papers read during the session were "Coal Mining," by A. Colman, and "Motor Cars," by E. Blanco. The premium was presented to Mr. Dowell by Mr. W. H. Maw, M.Inst.C.E., President of the Institution of Mechanical Engineers, on the occasion of the ninth distribution of certificates at the above school, on December 18.

Books.

Egypt Exploration Fund: Archæological Report for 1901-1902. Edited by F. Ll. GRIFFITH, M.A. London: Offices of the Egypt Exploration Fund; also Kegan Paul, Trench, Trübner, & Co.; Bernard Quaritch; and Henry Frowde. 1902.

THIS is a summary of the work of the Egypt Exploration Fund and the progress of Egyptology during the year 1901-1902, with the addition of a map of the delta of the Nile, with ancient and modern names distinguished by special type. It will be of interest to all Egyptologists as giving an all-round record of the subjects at present foremost in Egyptology; but there is not much that directly bears on our subjects, the Report dealing mainly with general history and archæology. We notice, however, one curious memorandum in regard to Imhotep, who is shown by a German critic, Herr Sethe, to have been only regarded as a divinity in later times, while in earlier documents he is referred to as a deceased philosopher, and is proved to have been traditionally the architect and chief magician of King Zeser of the third dynasty, the builder of the pyramid at Sakkareh. "There seems no particular reason," says the editor, "to doubt the truth of this tradition; and Imhotep's tomb may reasonably be looked for at, or near, the centre of his cult at Serapeum." This identification of architect and magician in the same person, and his subsequent elevation to the rank of a divinity, is quite in keeping with what we may imagine as to the mystical element in ancient architectural design.

Building Construction and Drawing. By CHARLES F. MITCHELL. First Stage, or Elementary Course. Sixth edition, thoroughly revised and enlarged. London: B. T. Batsford. 1902.

THIS is another of those books avowedly compiled to "assist students" in preparing for various examinations by various Boards. Consequently, if any exception be taken to the treatment of the subject, blame should really attach to the character of the papers set. Mr. Mitchell gives us in an appendix to the volume before us a fair example of such papers. The perusal of them would surely satisfy anybody or anything—but a Board—that they are merely suitable (if suitable at all) to lads engaged in the building trades, and not in the profession of architecture. The tone of the advanced course is just the same—the epithet "advanced" being merely synonymous with "more detailed"—but still narrow—never broad. The book before us typifies the system; and it has had a wide vogue. When we look at the old books of construction, we find ourselves face to face, not only with a mass of information concerning bond in brick and masonry, &c., &c., but with detailed descriptions, "according to the author's devising," of the best and most approved methods of constructing domes, spires, roofs of every description, vaults, and what not. In fact, our forefathers learned how to construct the *structure*, and left good joiners and plumbers to prepare the place for human habitation. No modern architect will deny the necessity of intimate acquaintance with the various trades whose labours he has got largely to superintend. Nevertheless, he must draw the line somewhere; and, furthermore, he has the right to complain if minor details of the subsidiary building trades force their way into text-books on the science of building, to the exclusion of the larger scientific devices which, sooner or later, should be known to the student, and which it should be his care and delight to improve upon.

In the book before us (with a title suggesting the treatment of the *elements* of the subject) there are numerous plates showing locks and keys, door furniture, tools of every description, down to delicate perspective drawings of the common saw. But ask the student learned in Mr. Mitchell's book how to construct scientifically and charmingly a lantern over a stable or hall, and he is done! As for domes (of simple design) and steeples, no guide is given him.

The chapter on roofs ignores the existence of any with curved braces; and the nature of the hammer-beam roof is not made plain; in fact, it is not dealt with. Now, as a matter of practice, the exact forms of nuts, screws, water pipe joints, common saws, &c., can be gathered from the piles of building material stacked upon the site of any work in progress. Or it is open to the curious to pursue a course of study on these points in books written upon the special trades involved. Moreover, the precise names of every part of a given piece of fixing and the slang names for every conceivable tool (which form a conspicuous feature in Mr. Mitchell's new edition) can be picked up during those hours of intercourse with labouring hands which every young member of the profession or trade looks forward to as an instructive part of his life. But he ought to be able to find every imaginable way of constructing roofs scientifically and finely (according to the best examples) in his "Building Construction Treatise," where, too, he should learn how to build towers, bridges, vaults, and spires. Many a man never gets a chance of learning these things, either on account of the limited nature of his principal's practice, or because merely draughtsman drudgery is his portion during the most receptive years of his intellectual life.

When we said that the nature of the examinations was largely to blame for this state of things, we spoke truly; but matters are made worse by the fact that certain Educational Boards put on as examiners the very men who write trade text-books, so that the subject is perpetually narrowed by the limitations of both tuition and examination — the whole course of study being, as far as the middle-class architectural student is concerned, controlled by the same or a similar agent.

The particular edition before us is considerably enlarged, but not, we think, to very much real advantage. It is almost a cram-book for the building-trade apprentice, and we cannot honestly recommend it as a scientific book with a wide range (as it should have), to serious students of architecture.

The Modern Carpenter, Joiner, and Cabinet-Maker. A Complete Guide to Current Practice. Prepared under the Editorship of G. LISTER SUTCLIFFE. London: The Gresham Publishing Co. 1902.

THIS is a work upon which it is impossible to pronounce any definite opinion until the publication of the remaining volumes. The two which are already issued contain three out of the proposed sixteen sections, of which the first, by Mr. G. Lister Sutcliffe, deals with "Architectural Styles"; the second, by Mr. Frank Tiffany, with "Woods: Their Characteristics and Uses," and the third, by Mr. A. Macintosh, with "Wood-Working Tools and Machinery"; whilst the two next will be upon drawing and practical geometry. It will thus be seen that the philosophical method has been observed of treating the preliminary subjects in their natural order before proceeding to those which give their title to the work. It is greatly to be regretted that this method was not explained and commented upon by the editor in a good preface.

The importance of the above-mentioned subsidiary subjects to the wood-worker is, of course, sufficiently obvious, except in the case of architecture; but the value of this section—the relationship in which architecture stands to the lesser arts of joinery and cabinet-making—should certainly have been pointed out, if not in a preface, then in the text of the section itself, which seems, however, to have been written merely as though for an independent text-book. It should have been pointed out that the value of some architectural knowledge to the wood-worker is not, as is generally supposed, to enable him to imitate with unintelligent servility Classic and Gothic mouldings, or other architectural details, in an alien material or otherwise unsuitable application; that it consists rather in some indefinable, but no less salutary, influence on the character of the man and his work, analogous to that of a classical education on literary or professional men. As these, we have been told, require to know "the best that has been thought and said," so does the handicraftsman require to know the best that has been thought and done in times prior, or by genius superior, to his own; not that he may imitate, but that he may understand. Regarding the subject from this point of view, nothing could be more valuable than the brief, but admirable, indication of the subtleties of the Parthenon, on page 8, given, as the author observes, "to show the immense

amount of thought which Greek architects bestowed on their designs, and the great care which the workmen exercised in carrying out the work."

In the two following sections the work is of curiously unequal merit. A glance at the tables of contents, or at the numerous excellent illustrations, would lead one to suppose that the work was of an exhaustive character, but this is by no means the case. What is original, for instance, in the descriptions and rules for identification of the various timbers compares very unfavourably with the admirable key to North American woods published by the United States Department of Agriculture, and here reprinted by permission. The section on tools and machinery would seem to be much the weakest, but that it has yet to be supplemented by those sections which describe their use; for which reason we forbear further comment until the publication of the remaining volumes.

The Woodworker. Vol. I. London: Dawbarn & Ward. 1901-2.

IN illustrated journals of this class there are certain methods of instructing the amateur or professional craftsman which are valuable and legitimate enough; and there are certain others which are illegitimate and absurd. It is an admirable and usually a legitimate method to give illustrated descriptions of work by the best masters, modern or antique, such as is to be seen in our various exhibitions and museums; and in the twelfth number of the *Woodworker* we are glad to see the first of a series of articles on specimens of furniture at the South Kensington Museum. It is a legitimate enterprise, though by no means an easy one, to provide good articles on the elements or technical details of construction in joinery and the allied crafts. It is quite legitimate, and for the amateur it may perhaps be useful, to give directions and working drawings for the construction of such articles as rabbit hutches, bee-hives, or kitchen tables—of articles, that is to say, which are obviously intended to be useful rather than ornamental. But to go further than this—to provide a large number of enthusiastic and often ignorant amateurs with professedly original designs for articles of furniture which are professedly ornamental, the said designs being for the most part anonymous—is a practice which is illegitimate and absurd.

In the first issue of the *Woodworker* is an anonymous and original design for a piece of furniture which is nothing if it is not beautiful—a bedroom overmantel. Whether in itself the design is good or bad is beside the question, though it may be noticed in passing that, since the ornament of this design consists of no less than eight exactly similar parts, it would seem to be adapted rather for the steam-factory than for the amateur's workshop. The point to be noticed is that this design will be accepted as "scripture," and possibly reproduced, by a large number of ardent amateurs; and this is a responsibility which should only be undertaken by an acknowledged authority in design, and one who is willing to avow his authorship. But this is not the worst. For this and other such designs, illustrated as they usually are, from photographs of the finished article, it may be argued that, having been produced in the first place for the artist's own purposes, and therefore to the best of his ability, they are not without a certain degree of merit. But it appears further that any reader of the *Woodworker* may obtain, merely for the asking, an original design for any article of furniture that he wishes to make, prepared specially for himself, and published in the correspondence columns of the journal. The incident of the hat and umbrella stand in the April number is a truly comical example of this system, calculated, we fear, to vitiate the nascent taste of the deluded inquirer.

R's Method: Perspective at Sight. London: G. H. Tyndall, and Reeves & Sons. 1902. 2s. 6d.

THIS is a new and ingenious device, the real author of which is a Fellow of the Institute of Architects, for enabling sketchers to draw in perspective without knowing anything of the theory of it, and to some extent to learn perspective by putting it in practice. The materials are very simple; a sketch-book made of bank-note paper, which is sufficiently transparent for the intended purpose and at the same time offers a good surface for pencil drawing; and a few sheets of paper of the same size (contained in a pocket at the end of the book), ruled with strong black lines, which will show through the paper, to two vanishing points. One of these is placed under a leaf of the sketch book, the sketcher taking a standpoint which will give the building or other object at the same angle (as near as can be judged by the eye) as is shown by the guiding lines on the paper, and draws it following the vanishing lines laid down on the paper, and traceable through the page. The diagrams are arranged for several different points of view, with the plan of the angle given above; and there is also a table showing at about what comparative distance the sketcher should stand from the object for each diagram—a distance relative, that is to say, to the height or size of the object and the scale on which he wishes to draw it.

This all sounds very empirical no doubt; a kind of "perspective made easy"; but as a practical method of initiating a beginner into perspective there is really a great deal to be said for it; those who use it will, in the using, come to perceive, in a natural and easy manner, what perspective really is, and put practice before theory, just as children learn to talk before they understand grammar.

It may be added that by a system of figured measurements at the margins of the diagrams, a plan and elevation to scale can be put into perspective with approximate correctness, without any preliminary construction lines. The thing is very ingenious and may be practically very useful.

A Treatise on Shoring and Underpinning. By C. HADEN STOCK. Third edition, revised by F. R. FARROW. London: B. T. Batsford. 1902.

WHEN the late Mr. Stock's book on "Shoring and Underpinning" first appeared we noticed it as a thoroughly satisfactory book on the subject, giving all that was required and no more. It has since then been the one book of reference on the subject for students.

In his preface to the third edition Mr. Farrow admits that little was necessary in the way of alteration, and that it would have been impossible to rewrite any considerable portion without sacrificing something of that clearness and conciseness which give it much of its value. Extracts from the London Building Act of 1894 have been introduced in the place of those from the Act of 1855, in force when the first and second editions were published; but otherwise little revision has been required.

The Care and Management of Stationary Steam Engines. By CHARLES HURST. London: Crosby Lockwood & Son. 1902.

ALTHOUGH written for men in charge of engines, and especially of mine engines, this little book contains many practical hints that ought to be generally serviceable to steam users. Some remarks upon the presence of water in main steam pipes and the precautions to be taken in opening any steam valve discharging into a long range of pipes, are worthy of perusal even by those who do not propose to become responsible for the management of steam engines. The author makes no attempt to be profound, and the chief merit of his work is its essentially practical nature.

"The Practical Engineer" Pocket Book for 1903. Manchester: Technical Publishing Co.

IN the present edition of this notebook there are several useful additions relating to the flow of water through pipes, tests of steam turbines, liquid fuel, the production of very low temperatures, and metrical equivalents of feet and inches. Some sections still require revision, and notably those dealings with beams and columns. Very little space is accorded to centrifugal pumps, and the turbine pump does not appear to be mentioned at all. It is a great pity that the index is hidden away among, and printed upon, advertisement pages, and also that it appears to be regarded as subservient to the two indexes to advertisers.

"The Practical Engineer" Electrical Pocket Book and Diary for 1903. Manchester: Technical Publishing Co.

THE fourth annual edition of this useful and valuable pocket-book contains several important additions, notably articles on conduit systems of wiring and on the comparative cost of the working of hydraulic and electric lifts. There are one or two minor points that might be altered with advantage. We come across "frustrum, trigon, tetragon, elconagon (?)" instead of frustum, equilateral triangle, square, and icosagon—if, indeed, a word is wanted for a regular twenty-sided plane figure. In defining a litre (page 276) it is stated that it is the volume of "a cylindrical brass vessel, which at the temperature of 0 deg. Cent., when full, contains one kilogram of distilled water at the temperature of 4 deg. Cent." If this is a correct translation, the Bureau International are not to be congratulated on having evolved a physically impossible definition.

BOOKS RECEIVED.

BENT IRON-WORK. Edited by Paul N. Hasluck (Cassell & Co. 1s.)

The Student's Column.

THE CHEMISTRY OF BUILDING MATERIALS.

26.—THE CHEMICAL EXAMINATION OF PAINTS AND PIGMENTS.

IT is impossible to describe in these columns analytical processes for all the pigments, but a description of the methods by which some of the commonest paints and pigments may be analysed, or examined for adulterants, will serve to indicate the lines upon which the examination of paints and pigments generally may be conducted.

Analysis of White Lead Paint or Paste.

Estimation of Turpentine Spirit.—If the paint contain turpentine spirit the proportion of spirit present may be approximately estimated by heating 100 c.c. or 100 grammes of the fluid paint in a small distillation flask to a temperature of 180 deg. C., and collecting the distillate in a graduated cylinder. About 97 per cent. of the turpentine may be collected in this manner, but the remainder undergoes oxidation and will not distil over. An alternate method of estimating the turpentine spirit is to pass steam through a known volume of the paint heated to about 100 deg. C., and to collect the distillate of water and turpentine spirit in a graduated cylinder. The condensed turpentine spirit floats upon the water.

Estimation of Fixed Oil.—Weigh 5 grammes of the sample in a small beaker, add sufficient benzoline (free from any impurity, which will remain as a residue when the benzoline is allowed to evaporate) to completely cover the paint, stir with glass rod, and allow to stand for at least an hour. Decant liquid on to filter-paper. To insoluble residue in beaker add another small quantity of benzoline, allow to stand for some time, and then filter through same paper as before. Continue to add small quantities of benzoline in this way until it is found that a few drops of the filtrate passing through the paper, when collected on a watch-glass and allowed to evaporate, leave no oily residue. Transfer the pigment still remaining in the beaker to the filter-paper and dry it. The oil may be separated from the benzoline in which it is dissolved by distilling off the benzoline by means of steam heat. The oil remains alone as a residue in the distilling flask, and should be dried at 100 deg. C., and weighed when cold. It should be remembered that benzoline is highly inflammable, and must therefore be kept away from the neighbourhood of flames.

Analysis of the Pigment.—Weigh 2 grammes of the dry white pigment from which the oil has been removed, and treat with excess of dilute nitric acid. White lead, chalk, or barium carbonate will dissolve in the nitric acid, but any barium sulphate or white clay which may be present will remain insoluble. Filter, wash, ignite, and weigh insoluble matter, if any be present. To filtrate, add twice its volume of methylated spirit and an excess of dilute sulphuric acid. The lead will be precipitated as lead sulphate. If calcium or barium carbonate were present in the original pigment, the lead must first be separated by precipitation as lead sulphide, as described below. Collect the lead sulphate on filter, wash with water acidulated with sulphuric acid, and finally with alcohol. Find weight of lead sulphate, as

directed in Chapter 24. Multiply weight of $PbSO_4$ obtained by 0·8525 to find weight of white lead ($2PbCO_3 + PbH_2O_2$).

A sample of stiff white lead paste examined in this way gave :—

Oil	6·3 per cent.	
Insoluble matter ...	Trace „	
$PbSO_4$	109·2 „	= 93·09 per cent. white lead.

If carbonate of lime or barium be present as an adulterant in the white lead, these would dissolve in the nitric acid together with the white lead, and calcium or barium sulphate would be precipitated with the lead sulphate upon the addition of sulphuric acid. If, therefore, either of these carbonates have been found, by qualitative analysis, to be present, the nitric acid solution must be evaporated nearly to dryness to remove the excess of nitric acid, two or three drops of hydrochloric acid be then added, and finally about 150 c.c. of distilled water. Sulphuretted hydrogen should then be passed through the solution until all the lead has been precipitated. The barium or calcium will remain in solution.

Collect the lead sulphide on filter paper and wash with water containing sulphuretted hydrogen. The lead sulphide may then be transferred to a clean beaker, dissolved in strong nitric acid, and after dilution treated with alcohol and an excess of dilute sulphuric acid. The precipitated lead sulphate may then be collected and weighed.

To the filtrate from the lead sulphide add excess of ammonium hydrate and ammonium sulphide. Iron or zinc, if present, will be precipitated. Filter, if necessary, and to filtrate add ammonium carbonate. Barium or calcium, if present, will be precipitated as barium or calcium carbonate.

The CO_2 in white lead may be estimated, after removal of any oil which may be present, by means of Schrotter's CO_2 apparatus as described in Chapter 23.

Red Lead may be analysed in the same manner as white lead, but when dissolving the powder, free from oil, in dilute nitric acid, it is necessary to add a lump of sugar, or some other suitable oxygen-extracting substance in order to convert the PbO_2 into PbO ; for PbO_2 is insoluble in nitric acid. To find weight of Pb_3O_4 (red lead) from the weight of $PbSO_4$ obtained, multiply by the factor 0·7535.

Any red brick-dust which may be present will remain insoluble in the dilute nitric acid, while if any oxide of iron be present it will dissolve in the nitric acid and impart a yellow colour to the solution. The iron will not be precipitated with the lead upon the addition of sulphuric acid, and may be estimated in the filtrate from the lead sulphate by boiling the filtrate with a slight excess of ammonium hydrate. The iron will be precipitated as ferric hydrate, and may be ignited and weighed as Fe_2O_3.

Red Oxide of Iron.—Boil 2 grammes of the dry pigment for half an hour with concentrated hydrochloric acid, and then dilute with water. The oxide of iron will dissolve, leaving sand, red brick dust, or barium sulphate undissolved. Filter, if necessary, and to filtrate add slight excess of ammonium hydrate to precipitate the iron together with any alumina which may be present. The iron may be separated from the alumina and estimated as described in chapter 23.

Zinc White.—Boil 2 grammes with excess of moderately strong hydrochloric acid. The zinc white will dissolve, leaving undissolved any barium sulphite which may be present. Dilute, filter, and pass sulphuretted hydrogen through filtrate. The zinc will remain in solution, but any lead which may be present will be precipitated. Filter, if necessary, and to filtrate add ammonium hydrate and ammonium sulphide to precipitate the zinc as white zinc sulphide. Filter, and to filtrate add ammonium carbonate to precipitate calcium or barium, if present.

Dissolve the zinc sulphide in dilute nitric acid, then add excess of sodium carbonate. Collect the precipitated zinc carbonate, and wash until free from sodium carbonate. Then ignite the zinc carbonate at bright red heat until it has been entirely converted into zinc oxide. Weigh the pure zinc white (ZnO) thus obtained.

Zinc Sulphide.—Estimate the zinc as zinc oxide as in preceding analysis, and from weight of ZnO obtained calculate the corresponding weight of ZnS. When dissolving the zinc sulphide in hydrochloric acid, note that bubbles of gaseous sulphuretted hydrogen (which may readily be recognised by its odour) are evolved.

Barytes.—Barium sulphate is not dissolved to any appreciable extent by cold or hot dilute nitric, hydrocloric, or sulphuric acid. If a few grains of barium sulphate be heated with about half an ounce of strong sulphuric acid, the barium sulphate will be dissolved, but if this acid solution of barium sulphate be then allowed to fall, drop by drop, into a beaker nearly filled with distilled water, the barium sulphate will again become insoluble, and appear as a white precipitate in the water. Barium sulphate is the cheapest of the heavy pigments, and is therefore never adulterated ; but it is very largely used as an adulterant.

China Clay is not soluble in dilute acids. It may be analysed by the process for the analysis of clays described in Chapter 24.

Whiting.—Whiting and all other forms of carbonate of lime are readily soluble in dilute hydrochloric acid, and may be analysed by the process for the analysis of limestones described in Chapter 23.

Gypsum.—Sulphate of lime is readily soluble in dilute hydrochloric acid. The solution of gypsum in hydrochloric acid may be divided into two portions. In one portion the sulphur may be estimated by boiling with excess of barium chloride solution, and collecting, igniting, and weighing the $BaSO_4$ precipitated from the solution. The second portion may be treated with excess of ammonium chloride and ammonium hydrate, and then with ammonium oxalate. The calcium will be precipitated as calcium oxalate, which may be ignited and weighed as CaO in the usual manner.

Prussian Blue is insoluble in dilute acids. When boiled with strong sulphuric acid it is decomposed into sulphate of iron and hydrocyanic acid, the latter, which is intensely poisonous, being evolved as a gas. Prussian blue is readily soluble in oxalic acid. When boiled with caustic soda, Prussian blue is decomposed and brown ferric hydrate is formed. If the ferric hydrate be filtered off, and excess of hydrochloric acid be added to the filtrate, and then a few drops of ferrous sulphate solution, a blue precipitate will be produced.

Chrome Yellow.—Chrome yellow consisting entirely of lead chromate will dissolve completely in strong boiling hydrochloric acid, and produce a clear, green solution ; but as the solution cools, white crystals of lead chloride will be deposited. When boiled with caustic soda, chrome yellow changes to red, and then dissolves ; barium sulphate, if present, would remain insoluble.

Aniline Colours.—Aniline colours and organic colour extracts, when heated to bright redness in a platinum dish, burn away and leave no residue. Sometimes insoluble organic colouring matters are made into soluble paste with the aid of sulphuric acid and soda ; in such cases a white ash consisting of sodium sulphate will remain after ignition.

Lamp Black.—Ignite 2 grammes in platinum dish at bright red heat until the whole of the carbon has been burnt off, and the ash remains constant in weight. The ash should not exceed 3 per cent. in common lamp black, nor 0·5 per cent. in vegetable black. In genuine bone black and ivory black the ash may amount to 75 or 80 per cent.

Copper in pigments may be detected by boiling the pigment with dilute hydrochloric acid, removing by filtration any insoluble matter, and then diluting the filtrate and passing sulphuretted hydrogen through it. If copper be present, a black precipitate of copper sulphide will be produced, and this may be collected on filter and then transferred to a beaker and dissolved by boiling with dilute nitric acid. Upon the addition of an excess of caustic soda solution to the boiling solution of nitrate of copper, the copper will be precipitated as black copper oxide, which may be collected on filter, ignited, and weighed.

Arsenic in pigments may be detected by Marsh's test, which depends upon the fact that arsenic enters into combination with nascent hydrogen to form gaseous arseniuretted hydrogen ($As H_3$). Antimony reacts with nascent hydrogen in a similar manner, but antimoniuretted hydrogen may readily be distinguished from arseniuretted hydrogen by the test described below.

Marsh's test may be applied in the following manner : Fit a small flask with a gas-tight cork through which passes a thistle-headed funnel, by which acid may be introduced, and also a glass tube bent at right angles for conveying the gas from the flask. To the eduction tube connect a tube containing calcium chloride to dry the gas, and then to the outlet of the drying tube connect a piece of hard glass tube drawn out to a jet at the end most remote from the drying tube. Place some pure zinc in the flask, cover it with water, and then introduce some dilute sulphuric acid. When hydrogen is being continuously generated and all the air has been driven out of the apparatus, the gas may be ignited at the jet. Now hold a piece of cold porcelain in the flame in such a manner that the flame spreads over the surface of the porcelain. If any stain be produced upon the porcelain either the zinc or the acid employed is impure and must be rejected for this test ; but if no stain be produced, the flame may be extinguished and a small quantity of the pigment introduced into the generating flask. Again ignite the gas issuing from the jet, and depress the cold porcelain into the flame. If the pigment contained arsenic a brownish-black stain (arsenic) possessing a metallic lustre will be formed upon the porcelain.

If the pigment contained antimony, but not arsenic, a deep dull black stain (metallic antimony) will be formed upon the porcelain.

The arsenic stain may readily be distinguished from the antimony stain by placing upon the stained porcelain a few drops of bleaching powder solution ; the stain will disappear if due to arsenic, but not be appreciably affected if due to antimony. If only a portion of the stain be soluble, it is probable that the pigment examined contained both arsenic and antimony.

If the arseniuretted or antimoniuretted hydrogen flame be extinguished and the hard glass tube be heated near the middle by a Bunsen flame, a lustrous mirror of metallic antimony or arsenic will be produced in the colder portion of the tube. Arseniuretted hydrogen has a garlic odour, and is intensely poisonous.

The generating flask used for Marsh's test should be small, in order that all the air may be speedily displaced by hydrogen. Accidents sometimes occur owing to an explosion being produced by the ignition of a mixture of hydrogen and air.

Marsh's test will show the presence of very minute quantities of arsenic. When a pigment containing a large proportion of arsenic, such as Scheele's green, has to be examined, a known weight of the pigment may be boiled with hydrochloric acid. Then dilute with water and filter off any insoluble matter. Through filtrate pass sulphuretted hydrogen until the whole of the copper has been precipitated as copper sulphide, and the arsenic as arsenic sulphide. Filter, and then boil the mixed sulphides with dilute caustic soda solution. The arsenic sulphide will dissolve ; but the copper sulphide will remain insoluble and may be removed by filtration. If to filtrate an excess of hydrochloric acid be added, the arsenic will be again precipitated as yellow sulphide of arsenic ($As_2 S_3$) which may be collected on weighed filter paper, washed, dried at 100 deg. C. and weighed.

DIARIES AND ALMANACS.

MESSRS. HUDSON & KEARNS (83, Southwark-street, S.E.) have sent us samples of their well-known diaries. The "Architect's Diary" is issued in two sizes (Nos. 12 and 13), No. 13 having two days to a page and No. 12 one ; but apart from this the diaries are apparently the same. In addition to the information usually to be found in such publications, they contain lists of Metropolitan surveyors (with official and private addresses) ; architectural, surveying, and engineering institutions, with the names of their Presidents, &c. ; cases of interest to the profession decided in the Superior Courts of Justice during the legal year ; and professional practice and charges of architects, &c. The "Builder's Diary," No. 11, has half a page to a day, but it contains useful tables and other information suitable for builders. No. 9 is also a useful diary, similar to No. 11, but with none of the tables and much less information. These diaries, the excellence of which we have often referred to, are ruled and printed in order to suit professional men, and it does not seem possible to improve upon them.

Messrs. Hudson & Kearns have also sent several of their special diary blotting-pads. They are ingeniously arranged, and are not only useful as writing and blotting pads, but also comprise a blotting pad diary and a daily date remembrancer. From long experience

we can speak highly of these pads, especially No. 8A and the bankers' pad.

Messrs. Waterlow Brothers & Layton (24 and 25, Birchin-lane, E.C.) have again issued their useful and well-arranged "Architects' and Surveyors' Diary." It contains the information usually to be found in a work of the kind, and, in addition, lists of Fellows and Associates of the Royal Institute of British Architects, Surveyors' Institution, Institution of Civil Engineers, &c.; papers on "Redemption of Land Tax," "Commutation of Tithes and Tithe-Rent Charge," "Poor Rates and Assessments," and "Law Relating to Actionable Nuisances;" the London Building Act, 1894; Law of Distress Amendment Act, 1895; a Digest of the Principal Acts Relating to Buildings, &c.; Conditions and Contract on taking Building Land; General Conditions for Building Contracts; Professional Practice and Charges of Architects; Practical Table and Calculations for Estimating and Making Valuations; and other useful information. The diary, of which the issue for 1903 is the twenty-second yearly issue, is published at 3s. 6d. and 6s.

The City Diary for 1903 (W. H. & L. Collingridge, Aldersgate-street, E.C.), is the fortieth edition of a very useful and well-arranged little work, which is published at 1s. The work is a diary in the general acceptance of the term, but, in addition, it comprises a guide to the various municipal, parochial, and social organisations of the City of London. In particular, it devotes especial attention to the Corporation, the City Companies, the London County Council, the Metropolitan Asyluns Board, the School Board, and the other rating authorities; and the numerous institutions which represent civic life in its varied aspects. The diary proper has three days to a page, and is interleaved with blotting paper.

"The Railway Diary and Officials' Directory for 1903" (McCorquodale & Co., Ltd.) contains much useful information, especially to those interested in railways. A valuable feature of the publication is the Railway Directors' and Officials' Directory, Traffic Returns, Accounts and Dividends. With the diary, which is published at 1s., is issued a large sheet almanac.

"The Gloucester Diary for 1903" (F. G. Brooke, for the Gloucester Railway Carriage and Waggon Co., Ltd., Gloucester) contains several useful features, including a list of the stations and junctions attended by the Company s waggon repairers.

Messrs. J. Weeks & Co., Ltd., horticultural builders and hot-water engineers (King's-road, Chelsea, S.W.), have published through Messrs. Waterlow & Sons, Ltd. (London-wall) a pocket book and diary for 1903.

The Monthly Diary for 1903 (published at 1s. by Messrs. Bemrose & Sons, Ltd., Snow Hill, E.C.), consists of twelve neat parts, a page to a day, without the usual postal and other information. Each part can be carried in a waistcoat pocket, and put on one side at the end of the month.——The Daily Tear-off Calendars for 1903, published by the same firm at 1s. each, are well known and appreciated. They are made to hang on a wall or to stand on a table. The quotations on each tear-off of some of these calendars are often well selected.

Messrs. Ashwell & Nesbit, Ltd., warming, ventilating, and sanitary engineers, London and Leicester, have published a Shakespearean tear-off calendar. The date is printed in bold type.

OBITUARY.

MR. CRONK.—We have to announce the death, on the 11th inst., at his residence, No. 4, Mount Ephraim-road, Tunbridge Wells, of Mr. Henry Hickman Cronk, in his sixty-fourth year. Mr. Cronk was the senior partner of the firm of Messrs. H. H. & E. Cronk, of Mount Ephraim-road, Tunbridge Wells, architects. He was employed as architect for the alteration of and additions—comprising a new tower, a new south aisle, and an enlarged vestry and south transept—to St. John's Church, Tunbridge Wells, increasing the accommodation by 200 sittings, 1896; the Great Hall; the extension of the General Hospital in Grosvenor-road, Tunbridge Wells, first established in 1828, and almost entirely rebuilt, for fifty-four beds, in 1869-70; and, we gather, for the enlargement and alteration, together with decorative and sanitary works, &c., at Claridge House, near Sevenoaks, about ten years ago. His firm prepared the plans and designs for the Byng Hall, Institute, and Rooms for the parish and church of St. John, Tunbridge Wells; the Crabb Memorial Institute, in Victoria-road, of which the foundation-stone was laid on February 21, 1901; and of many private houses, parish-rooms, and similar buildings in the town and its vicinity, including school buildings at High Brooms, Southborough. Mr. Cronk took a prominent share in the conduct of municipal affairs; he was an Alderman of the Council, and served as Mayor in 1893-4.

MR. FORD.—We have also to record the death, on the 10th inst., at his residence in Sidmouth-avenue, Newcastle-under-Lyme, of Mr. George Beadmore Ford, in his seventieth year. Mr. Ford was the senior partner of the firm of Messrs. Ford & Slater, practising as architects and surveyors at Overhouse-chambers, Burslem. Mr. Ford was a son of the late William Ford, of Burslem, builder; after having served his articles to John Ward, an architect at Hanley, he started in business at Burslem, and as his practice increased took Mr. W. F. Slater into partnership. Of the chief architectural work carried out by him and his partner we may instance the Primitive Methodist Institute and Sunday School buildings at Burslem, and the new Wesleyan Schools and Chapel at Basford, near Burslem, for which Mr. W. F. Slater's designs won the first premium in an open competition; the entire scheme comprises the schools, a minister's house, and a church, at a total estimated cost exceeding 7,000*l*. Mr. Ford made the plans and designs for an enlargement of the Wedgwood Memorial Institute, established in honour of Josiah Wedgwood in his native town, of which the late W. E. Gladstone laid the first stone, and which was opened on April 21, 1869, the late R. Edgar being the architect; he was the architect of many school buildings, churches, chapels, and pottery works in the county and around. Mr. Ford served as Surveyor to the Wolstanton R.D. Council; having filled the office of Mayor of Burslem in the interval 1883-5, he was elected an Alderman of the Council, and occupied that post until his retirement about two years ago.

GENERAL BUILDING NEWS.

RESTORATION OF ST. CUTHBERT'S CHURCH, THETFORD.—The reopening service of St. Cuthbert's Church, Thetford, was held recently, the work of repair being almost complete. The committee decided to build a new north aisle bordering quite close to the footpath in King-street, but, the space being irregular and limited, considerable care had to be exercised in planning the aisle. It was also decided to remove the old roof and flat plaster ceiling over the nave, which, when carried out, revealed the fact that the timbers were in an utterly rotten condition. The state was so bad that during the progress of the removal some of the beams fell, and demolished what remained of the east gable. The new north aisle is built in similar character to the south aisle, and is divided from the nave by an arcade of four bays, with stone shafts, bases, caps, and arches. There are four new clearstory windows in the north wall of the nave over the arcade. Every fragment of old stone work has been refixed. The old windows have been used, and some old carved stones refixed. The roof of the new aisle has been carried out in pitch pine, covered with boarding and lead. Over the nave a new waggon-headed panelled roof has been constructed, divided into four bays, with moulded principals, and having bosses at the intersections of the panel mouldings. The jambs of what should have been the chancel arch, which were of very poor modern plaster work, have been replaced by new stone jambs, and a moulded stone arch has been constructed. All the paths of the north aisle and nave have been laid with block pitch-pine flooring. The contract for the north aisle was placed in the hands of Mr. R. Chapman, of Hanworth. The nave roof and other work in the nave were executed by Mr. S. Holden, of Thetford. The stone work for the new aisle and chancel arch was executed by Messrs. R. Hall & Son, of Thetford, the glazing being executed by Mr. T. Horth, of Norwich, and the plastering by Mr. W. G. Crotch of Norwich. The hot water heating on the low pressure system has been caried out by Messrs. Barnes & Pye of Norwich. The furnace for the heating apparatus is fixed under the vestry, which was built a few years ago, under the supervision of Mr. A. J. Lacey. The gas arrangements were fixed by Mr. J. Hardy, under the supervision of Mr. C. Snelling of the Gas Works. Incandescent lights are used, with Kern burners and Bartlett lighters regulated from the meter. The architect was Mr. A. J. Lacey of Norwich.

NEW BUILDINGS IN ABERDEEN.—The Plans Committee of the Aberdeen Town Council have sanctioned plans of the following:—Dwelling-house on the north side of Anderson-drive, for Mr. Thomas Walker, manufacturer, per Mr. R. G. Wilson, architect; dwelling-house on the east side of Holburn-street, for Mr. John Mitchell, carpenter, per Mr. George J. Milne, architect; two dwelling-houses on the north side of Howburn-place, for Messrs. Cameron & Watt, architects; two dwelling-houses on the north side of Howburn-place, for Mr. William Murray, house proprietor, per Messrs. Cameron & Watt, architects; dwelling-house on the east side of King-street, for Mr. George Stalker, granite merchant, per Messrs. Sutherland & Pirie, architects; reconstruction of business premises at Nos. 37-39, Queen-street, for Messrs. John Bissot & Co., merchants, per Messrs. Cameron & Watt, architects; two dwelling-houses on the west side of Cornhill-road, for Mr. James Davidson, saddler, per Messrs. Brown & Watt, architects; two dwelling-houses on the south side of Devonshire-road, for Mr. John Strachan, shipmaster, per Messrs. Cameron & Watt, architects.

BANK BUILDINGS, INVERNESS.—A new block of buildings is being erected for the Royal Bank at the eastern junction of Union-street and Drummond-street, Inverness. The new buildings comprise not only the bank's own premises, which form the ground floor and basement fronting to Union-street, but also four shops with basements fronting Drummond-street, and two suites of offices extending over the whole of the first floor. The two upper floors will be divided into a dwelling-house and caretaker's premises for the two suites of offices. The plans were prepared by Mr. W. L. Carruthers, architect. The building is, for the most part, built of Moray freestone, but for the lower story Aberdeen grey granite has been utilised. The cost of the building in its finished condition is about 12,000*l*. Mr. William Fraser was clerk of works. The contracting firms were:—Masons, L. Maclean & Sons; carpenter, A. Anderson & Son; slater, A. C. Fraser; plumbers, A. Thomson & Co.; plasterers, Fowler & Kennedy; painters, Wm. Ross & Son; electric wiring, Wm. Barton & Sons, Glasgow; electric bells and telephones, Claud Hamilton & Co., Ltd; grates and ironwork, Rose-street Foundry; fireproof floors, R. A. Stoffert, Glasgow; heating, Mackenzie & Moncur, Edinburgh; terrazzo paving, the British and Italian Mosaic Co., Glasgow; strongroom fittings, Milners, Ltd.; bank fittings, Maciver & Co., cabinet-makers, Inverness.

THE NEW CENTRAL CRIMINAL COURT.—The foundation stone of the new Central Criminal Court, Old Bailey, was laid on the 20th inst. by the Lord Mayor. The architect is Mr. E. W. Mountford. By a system of mezzanine floors considerable height is allowed for the larger rooms and offices without the waste of space incurred by giving the same height to the smaller rooms. The various rooms and floors are thus also brought into closer connexion with each other. On the principal (or first) floor the four Courts open upon a central hall, to be approached by a grand staircase and surmounted by a dome. An important feature is the private corridor connecting the Court with the various retiring-rooms for judges and juries, and the apartments of the Lord Mayor, Sheriffs, Recorder, and Common Serjeant. A staircase leads from the corridor to the grand jury room below, giving private access for the grand jury to the Courts and for the Recorder to the grand jury room. The police cells are in direct communication with the dock in each Court, and are also wholly shut off from those portions of the building to which the public have access. The Lord Mayor's suite of rooms is upon the principal floor, grouped together at the head of a private staircase leading from the Lord Mayor's entrance, which is screened from the public streets by high gates. The offices for the clerk of the Court are upon the same floor. Upon the mezzanine floor beneath are the two rooms for the clerk of peace, and immediately beneath these again, upon the ground floor, are the indictment office and the rooms of the Public Prosecutor. All are closely united by their private staircase, communicating with a separate entrance from the Old Bailey and the record-rooms in the basement. The public secondary staircase also affords ready access to any of these rooms. The principal entrance to the ground floor is from the Old Bailey, and is 14 ft. in width. The grand jury room is at the east end of the Newgate-street corridor, in the quietest part of the building. It is entered through the bailiff's room, and has a private stair leading to the judges' corridor and Courts above. A private entrance for counsel, with staircase and passenger lift communicating with counsels' rooms upon second floor, is provided at the north-west corner. The Lord Mayor's entrance is upon the lower ground floor. A staircase leads to the Lord Mayor's rooms above, and there is room for a passenger lift if thought desirable. Half way up the staircase is a landing, with fireplace, which might be used as a reception hall or waiting-room. Two rooms for the police, with a room for the deposit of stolen property, are provided on the Old Bailey front; they have a separate entrance from the street, and communicate by the public secondary staircase with the upper floors. Upon the top floor is the robing-room for counsel; it is approached by a staircase and passenger lift from the private entrance on the ground floor. The various messrooms adjoin one another and the serving-room. The two kitchens adjoin and are practically one. The Judges' corridor and the Lord Mayor's suite of rooms are quite cut off from the public, and the prisoners from the time they enter the yard are completely isolated. In regard to the general construction of the building, the walls will be built of brick, faced externally with Portland stone. The floors throughout will be fireproof, and the various staircases will be of stone. The two large Courts are 35 ft. high to the top of the main cornice, above which the dome rises an additional 5 ft. The two

smaller Courts are 19 ft. high to the cornice, and 25 ft. to the crown of the arched ceilings. The estimated cost of the buildings is given at 225,173*l*. The building was illustrated in our issue for June 30, 1900.

MUSEUM, CARDIFF.—The proposed new museum buildings for Cardiff are to be erected in Cathays Park. A feature of the building when completed will be the entrance hall and the grand staircase, which will be entered from a recessed portico of three arches. The central hall and staircase, together with the landing of the first floor, will be lighted from above, so that they can be used for the exhibition of works of art, sculpture, &c. From the hall, central doorways give access to wings on the east and west sides respectively, whilst in the rear of the chief staircase, approached from the hall, will be the index hall, which will be some 40 ft. in breadth and 65 ft. in length, and will be capable of being lengthened considerably in the future. Wings for the exhibition of natural history objects will flank this index hall. The hall will be fitted with top-lights, and the floor space will be arranged with objects of natural history in cases so placed that they will represent some chief branch of study. The galleries for fine art, oil-paintings, water-colours, &c., will be on the first floor. The archæological department will probably be accommodated in a sub-basement, which will be specially lighted for the exhibition of Cardiff's collection of inscribed stones and crosses illustrating Celtic workmanship. The buildings will be in freestone, and of a character to harmonise with the municipal buildings in Cathays Park. Mr. Edwin Seward is the architect.

FREE LIBRARY, LEICESTER.—A new Central Free Library is to be erected at Leicester from plans prepared by Mr. Edward Burgess, architect, of Leicester and London. The new building will be situated at the corner of Bishop-street and Bowling Green-street, and the style will, to some extent, be in keeping with the Town Hall. The building will be built partly of stone. There will be two stories and a basement, which is to be utilised as a juvenile reading-room and a juvenile lending department. This portion will comprise a room 32 ft. by 31 ft., and another part of the basement will serve as a patent library, and a place for the reception of bound newspapers, in addition to providing warehousing accommodation. A tea-room for the staff will also be provided, and the whole basement will be lighted from a railed-in area from Bishop-street. The ground floor is approached from the main entrance in Bishop-street, the entrance hall measuring 26 ft. by 15 ft. On the right-hand side will be found the principal reading-room, 76 ft. by 31 ft., where newspapers and magazines will be provided for the convenience of both sexes. At the rear of the entrance hall two doors will give access to the lending library, a double room, 100 ft. in length, and providing space for something like 40,000 volumes. On the first floor, reached by a staircase from the entrance hall, the principal room will be the reference library and reading-room combined. The apartment will measure 76 ft. by 31 ft., and give space for 30,000 books. Arrangements will also be made for a ladies' room, 34 ft. by 21 ft., from which access can be gained to the reference department, and on the same floor will be the chief librarian's room and a committee-room.

BOARD SCHOOL, BRUNTSFIELD, EDINBURGH.—The warrants granted in Edinburgh Dean of Guild Court on the 11th inst. included sanction to the School Board to erect a new school at Viewpark, Bruntsfield Links. The school, which will be known as Boroughmuir Higher Grade School, will be a three-story building, providing class accommodation for 1,046 pupils. The classrooms will vary in size, from accommodating twenty-five pupils to sixty, and will be placed on the two upper floors, the ground floor being devoted to the laboratories and workshops. Physics and chemistry laboratories will each provide accommodation for thirty-six pupils working at the tables, and will have preparation-rooms adjoining, into which demonstration tables can be placed. There will also be a demonstration-room, suitable for lantern work, and a recreation-room on the ground floor. The workshops, two in number, will be so constructed that by means of a folding partition they may be transformed into one. The central hall on the first floor will cover 50 ft. by 42 ft., and from it access will be obtained to three passages, from which the various class-rooms will enter. Art rooms, lit on the north side, will be situated on the second floor, on which there will also be sewing and cookery-rooms. To the rear on this floor provision has been made for a large luncheon-room, with kitchen adjoining, and the building will have wide stairs and roomy corridors. It is proposed to ventilate the hall by mechanical means, and to heat it by hot-water pipes. The plans have been prepared by Mr. J. Carfrae, architect, Edinburgh.

ST. CYPRIAN'S HALL, BROCKLEY.—This building, after having undergone complete transformation, was opened on the 4th inst. A new entrance has been formed from the Brockley-road, and what were formerly entrances have been converted into exits. The hall generally has been considerably improved, the walls having been plastered, and a panelled dado, to a height of 4 ft., fixed round the hall. The roof has been treated in colour, giving it a lighter and loftier effect. The hall is lighted by two large sunlights, by Messrs. Strode, and heated by gas radiators. The stage, which has been reconstructed, is lighted with footlights of rather novel construction for a hall of this kind. Cloak-rooms are provided, and ladies' and gentlemen's retiring-rooms, &c. Mr. Collingwood, of Brockley, secured the contract in competition, and the work has been executed by him from drawings prepared by the architect, Mr. John Jas. Downes, of Lewisham, and under his supervision.

WORKHOUSE INFIRMARY, LYNN, NORFOLK.—The western wing at the new infirmary at the Lynn Workhouse has just been opened. Messrs. Smith & Son were the architects, and the builder was Mr. Cracknell. The new wing is built of red brick. It is intended for the male patients, and contains on the ground and first floors thirty-seven beds in each. Electric light is fitted throughout. On the front of the building is a covered veranadah.

ASYLUM BUILDINGS, BROOKWOOD.—The Bishop of Winchester dedicated recently the new buildings at Brookwood County Lunatic Asylum, which have been erected at a total cost of between 80,000*l*. and 90,000*l*. These buildings comprise additional men's and women's blocks, and a new chapel, the work having been carried out by Messrs. Rudd & Son, of Grantham, from the designs of Mr. Frank G. Howell, County Surveyor, Mr. Geo. Atlee acting as clerk of the works. The asylum now contains 435 male inmates and 640 female inmates, and a considerable number of Surrey patients are boarded out at similar institutions elsewhere. These patients will now be accommodated at Brookwood, the new male block providing accommodation for 146 inmates and thirteen attendants, and the female block for 201 inmates, ten attendants, and twenty-four nurses. Both are three-story buildings. The dayrooms, dormitories, and single-rooms are well-lighted and ventilated, and pleasant quarters are provided for the attendants and nurses, the latter having a block to themselves. The lavatories are contained in spurs, quite detached, except for a single entrance, from the main buildings. The accommodation on the women's side is more self-contained than on the men's, and includes a dining-room, 56 ft. by 30 ft., a sewing-room, and other conveniences. The additions are built of brick, with slated roofs, and are fitted throughout with electric light. The chapel is in the Early English style, capable of seating 850 people. It is built of yellow brick, relieved with red brick string courses and mouldings, and has a slated pitch pine roof, supported on columns of Portland stone. There are nave, north and south transepts, chancel, organ chamber, vestry, and ante-room at the west end, and the pews are of pitch pine on wood block flooring. The aisles and chancel are tiled, and glazed tiles of art shades line the chancel walls. The reredos and font are of Caen stone, and the pulpit is of pitch pine, while the heating and lighting are the same as elsewhere. Lead glazing and cathedral glass are used throughout.

DUNDEE BUILDING TRADE.—The building trade in Dundee during the past year has been somewhat fitful; there has been a marked shrinkage as compared with the previous twelve months, tending, according to experts, to a period of depression, the extent and consequences of which, at the moment, can scarcely be determined. During the period under review, operations, generally speaking, have not been widely diffused, but in the main have concentrated on one or two large contracts without which the trade would have been badly off. Outside of these little new work, of a kind adding to the architectural features of the city, has been inaugurated.

COTTAGE HOSPITAL, RHYMNEY.—The foundation-stones of a new cottage hospital for Rhymney have just been laid. The building, which will occupy a frontage of 93 ft., will be contructed of brick. On the ground floor there will be sixteen rooms, comprising two wards each fitted with four beds. The usual offices are attached to each ward. A corridor 7 ft. wide runs along the main building, connecting the patients' receiving-room and the operating-room with the wards. There are also on the ground floor a committee-room, the matron's sitting-room, staff dining-room, kitchen, store-rooms, pantry, scullery, &c. On the first floor there are three bedrooms, attendants' room, bathroom, lavatories, &c. Intervening between the two main blocks of building will run a verandah, 31 ft. in length. The whole of the grounds will be enclosed by a boundary wall, having one main entrance and two minor doorways. The estimated total cost of the building is 2,285*l*. The contract is in the hands of Messrs. W. Williams & Sons, New Tredegar and Bargoed, the architect being Mr. Llewellyn Smith (Messrs. Llewellyn Smith & Davies), Aberdare.

SANITARY AND ENGINEERING NEWS.

BACTERIAL TREATMENT AT REIGATE.—Colonel Coke, R.E., held a Local Government Board inquiry on the 10th inst. into an application of the Reigate Corporation for a loan of 14,000*l*. for works of sewage disposal. The Town Clerk stated that it was proposed to adopt the bacterial system, as the method of precipitation followed by land treatment had given rise to serious complaints owing to the land having become sewage sick. Accordingly in 1898 an experimental bacteriological installation was laid down, various methods being tested, and so satisfied were the Council with the results obtained from bacterial oxidation beds fed with the Candy sprinklers that they desired to carry out that system for the treatment of the whole of the sewage of the Borough. Samples of the effluent obtained from the system they proposed to adopt had been analysed by Dr. Jacob, Medical Officer of Health, and Dr. Stevenson, the eminent Home Office Analyst, whose reports were extremely satisfactory. Mr. F. T. Clayton, the Borough Surveyor, explained fully the details of the scheme, which comprises preliminary treatment of the sewage in catch tanks, followed by filtration through bacterial oxidation beds fed by Candy-Whittaker Revolving Sprinklers. The filtration will be double, firstly through coarse beds and then through fine beds with the oxidising material polarite, on the lines of the trial installation which has been in successful operation for four years, and with which the Borough Surveyor expressed himself fully satisfied. The new scheme, Mr. Clayton stated, would result in a direct saving of about 900*l*. a year to the Borough, and, indirectly, in a further considerable economy. Dr. Jacob, Medical Officer of Health, gave evidence that he had examined samples of crude sewage and effluent. The crude sewage contained brewery refuse, and also a very large quantity of tannery refuse, yet the effluent was always perfectly satisfactory, inodorous, and below the standard adopted by experts. The effluent was good enough, Dr. Jacob went on to say, to be turned direct into the stream. Dr. Stevenson's report, giving the chemical and bacteriological analyses of the effluent from the trial works, was read, and showed 94 per cent. of chemical and over 98 per cent. of bacteriological purification. It is interesting to note that there was a very large reduction in the bacillus coli communis, and in the spores of the bacillus enteriditis sporogenes, while previous bacteriological investigations by Dr. Griffiths showed that the Candy Sprinkler system destroyed the typhoid bacillus. The Mayor, Ex-mayor, and Chairman of the Sewage Farm Committee all expressed their approval of the scheme, on which the Ex-mayor remarked the Council were unanimous. At the conclusion of the inquiry Colonel Coke complimented Mr. Clayton upon his plans, and then visited the sewage farm, and inspected the existing works and the bacterial installation.

FOREIGN.

FRANCE.—Among the important works which the Conseil-Général of the Seine has in contemplation is the complete opening out of the Palais de Justice, a work which will cost nine million francs; and a similar operation in connexion with the Halles Centrales, at a cost of eleven million francs.——M. Mercié, the sculptor, has at last completed the model for the monument to Alfred de Musset, to be presented by M. Osiris to the city of Paris, and to be erected on the Place du Théâtre Français. Musset is represented as at the age of twenty-five, seated on a bench with a cloak drawn round him; a female figure behind seems to symbolise his future fame.——M. Willette obtained the first prize in the recent "Signs" competition.——M. Moyaux has been elected President of the Société Centrales des Architectes for 1903. The Vice-Presidents are MM. Lucien Etienne, Ch. Gautier, and Frantz Blondel (of Versailles).——M. Guilbert, the architect of the memorial chapel on the site of the Charity Bazaar fire in Rue Jean Goujon, has been commissioned to erect, at the other end of the site, an Armenian church, which will be in some sort a pendant to his first building. It will probably be completed in 1904. It will be in a severe Byzantine style, the centre roofed with an octagonal dome. The interior decoration will, according to the Armenian rite, be limited to some sculptured friezes and marble columns.——The new museum at the Petit Palais was formally opened on the 11th inst., and will now be open to the public from 10 to 4 every day, Mondays excepted.——A large new Post Office building is to be erected at Limoges.——The Hospice Debrousse, in the Rue de Bagnolet, Paris, is to be enlarged, at a cost not to exceed 1,300,000 francs.——The following six architects have been awarded premiums by the jury selected to judge the annual competition in street fronts: M. Dupommeneulle (for house 201*bis* Boulevard St. Germain); M. Fiquet (for 40 Rue Condorcet); M. Labro (for 6 Rue de l'Abbaye); M. Lavirotte (for 29 Avenue Rapp); M. Noel (for façade in Place des Saussais); and M. Pasquier (for 199*bis* Boulevard St. Germain).——M. Francois, a pupil of M. Moyaux, has obtained the prize founded by Americans at the Ecole des Beaux-Arts. The subject was "A Hotel for travellers in California."——M. Israëls has been elected a foreign associate member of the Académie des Beaux-Arts, in place of the late Russian sculptor Antocolsky.——In the exterior galleries of the Trocadéro an exhibition is to be arranged of illustrations of foreign architecture, grouped according to epochs corresponding to the main epochs of French architecture.——The Municipal Council of Paris has voted a sum of 380,000 francs for the completion of the Mairie of Montmartre.——Local schools of architecture are to be opened at Lille, Rouen, Rennes, Nancy, Lyons, Bordeaux, Marseilles, and Toulouse.——M. Vibert

has just completed a fine statue of "Liberty" intended for the Federal Palace at Berne.——A monument to Erckmann, one of the joint authors of the well-known war romances, was inaugurated last week at Luneville. It is the work of M. Bussière, a Lorrain sculptor, and shows a portrait bust of Erckmann on a stele, in front of which is a young woman in Alsatian costume representing the heroine of one of his romances.——A new Fine-Art School is to be erected at Nancy. It will probably be the subject of a public competition.——Important works are to be taken in hand for the sanitation of Toulon, at a cost of 3½ million francs.——M. Cordonnier has been elected President, for 1903, of the Society of Architects of the North of France.——The death is announced, at the age of fifty-eight, of M. Emile Ulmann, Divisional Architect of the Department of the Seine. He was a pupil of Hippolyte Lebas and of M. Ginain, and obtained the Grand Prix de Rome in 1871. Though in bad health for some time back, he had kept in the service, and had just completed an important plan for the enlargement of the Palais de Justice.——We have also to record the death, at the age of eighty-seven, of M. Alfred Isidore Piébourg, architect, of Chartres. He had been a pupil of the Ecole des Beaux-Arts and in the atelier of Huyot, and from 1850 to 1875 had occupied the position of City Architect at Chartres, where he built the municipal theatre and the library. He was also architect for a good many important private works, notably the Château of Marcouville. He had been for exactly half a century a member of the Société Centrale des Architectes.

AUSTRALASIA.—The South Australian Government are about to construct a harbour at Light's Passage, Port Adelaide. The Act providing for the construction places the cost at half a million sterling. The tenders are to be made returnable on December 2.——Her Majesty's Theatre, Sydney, is to be rebuilt from designs by Mr. Pitt an architect of that city, and the plans have already been approved by the City Surveyor.——A return by the Legislative Assembly of New South Wales shows that the total expenditure in respect of roads in the metropolitan district of Sydney for 1901-2 was 68,336*l*.——The Burns Memorial Committee in Sydney propose to invite tenders from Australian and British artists for the erection of a suitable memorial in honour of the Scottish poet, in that city.——A handsome memorial in white marble has been erected in Sydney Town Hall by the officers and men of the New South Wales Naval forces, to the memory of the members of the New South Wales Naval contingent who lost their lives on active service in China. The work was executed by Messrs. Ross & Bowman, of Pitt-street, Sydney.——Municipal buildings, from the designs of Mr. G. M. Pitt, jun., architect, of Pitt-street, Sydney, are to be erected at Narromine. They will consist of a large public hall, council chambers, and offices.——Large police buildings, on the site of the historic police offices, Phillip-street, Sydney, are about to be erected. The plans have been prepared by the Government Architect, and have been approved by the Minister for Public Works.

GERMANY.—Eight large statues are to be placed in the interior of the new Berlin Cathedral, by order of the German Emperor. The cathedral faces the Royal Palace; and the subjects to be represented are Luther, Melancthon, Zwingli, Calvin, Frederick the Wise, Joachim II., Philip the Magnanimous of Hesse, and Duke Albrecht of Prussia, Grand Master of the Teutonic Order.

AUSTRIA-HUNGARY. — The Croatian-Slavonic Banking Company contemplate erecting large business premises in Agram, and have invited competitions from Austrian and Hungarian architects. Three premiums are offered, namely, 2,500, 1,800, and 1,200 kronen, and the competition closes on January 25.

GREECE.—Designs are invited by the Greek Consul-General in Vienna for a new church to be erected in Patras. The competition is open to architects in all parts of the world, and is to close on January 31. The premiums are 10,000, 4,000, and 2,000 francs for the first three selected designs.

INDIA.—The Viceroy recently presided at a meeting in the Calcutta Town Hall, which was convened to discuss the question of the memorial to Sir John Woodburn, the late Lieutenant-Governor of Bengal. Amongst the suggestions most favourably received were a hospital and a statue.——A new railway station has been opened at Kalyanpur on the Eastern Bengal State Railway.——Surveys in connexion with irrigation schemes are to be undertaken in South Behar.——The Secretary of State has sanctioned the construction of the East Indian Railway from Shikohabad to Farukhabad, a distance of about sixty-six miles.——Office and house accommodation for the District Traffic Superintendent and District Engineer at Delhi are about to be erected at a cost of 85,000 rupees.——The Indian Government is about to erect a small-arms factory at Ishapur in Bengal, which is intended to make India independent of England, so far as the manufacture of small arms is concerned.——The Madras cement works have been considerably enlarged to meet the fast growing demand in the South of India.——Official investigations have shown that it will cost a crore of rupees to remove the bars in the Hooghly river.——The authorities of the Southern Indian Railway have sanctioned the plans and estimates for a new terminal station at Egmore.——A sanatorium for the open-air treatment of military men suffering from tuberculosis is about to be established at Ranikhet.

MISCELLANEOUS.

SOCIETY OF ARTS.—The Council of the Society of Arts, acting on the recommendation of the judges appointed by them—Sir William H. Preece, K.C.B., F.R.S., Mr. Robert Kaye Gray, and Mr. Alexander Siemens—have awarded the Fothergill prize of 50*l*., together with a silver medal, offered for an essay on "Existing Laws, By-laws, and Regulations relating to Protection from Fire, with Criticisms and Suggestions," to Mr. T. Brice Phillips, Sanitary Inspector to the Uckfield Rural District Council, of 4, Aylesford-terrace, Uckfield, for the essay, bearing the motto, "Fiat Lux." The Council have also awarded a prize of 10*l*., with a bronze medal, to Mr. George H. Paul, Lydford, Cyprus-road, Finchley, N., for his essay bearing the motto, "Ariston Metron"; and a similar prize to Mr. W. Craig Henderson, D.Sc., 1, Brick-court, Temple, E.C., for his essay bearing the motto, "Sola Virtus Nobilitat," these two essays being considered to be equal in merit. They also consider the essay sent in by Captain Arthur W. C. Shean, 18, Finsbury-circus, E.C., bearing the motto "Fuego," to be worthy of honourable mention. The judges reported that the essays were on the whole of a meritorious character, and, generally, of a high class. It is proposed that the prize essay should be read as a paper at one of the ordinary meetings of the Society of Arts.

AN IMPROVED PROTRACTOR.—A labour-saving drawing instrument recently introduced by Mr. F. Seaton-Snowdon, is a circular protractor by whose aid the trigonometrical ratios of the angles measured may be read at a glance. For this purpose the protractor is divided into four quadrants, on the first being given the sines and cosines, on the second the tangents and cotangents, on the third the secants and cosecants, and on the fourth the versed sines and coversed sines. It is contended by the inventor that the instrument not only saves the expenditure of time involved by the calculation, or by the hunting up of ratios in books of reference, but that its frequent use will help to impress such values on the memory of the operator.

INCORPORATED CHURCH BUILDING SOCIETY.—This Society held its usual monthly meeting on Thursday, the 18th inst., at the Society's House, 7, Dean's-yard, Westminster Abbey, S.W., the Rev. Canon C. F. Norman in the chair. Grants of money were made in aid of enlarging or otherwise improving the accommodation in the churches at Ravensthorpe St. Saviour, near Dewsbury, Yorks, 200*l*. in lieu of a former grant of 100*l*.; Field Dalling St. Andrew, near Holt, Norfolk, 30*l*.; Fordington St. George, near Dorchester, 30*l*.; Hoxton St. John-the-Baptist, Middlesex, 40*l*.; Mainder St. John-the-Evangelist, near Newport, Monmouth, 80*l*.; Skegness St. Matthew, 20*l*.; Toynton All Saints near Spilsby, 10*l*.; and Weston-on-the-Green S. Mary, near Bicester, 10*l*. A grant was also made from the Mission Buildings Fund towards enlarging May Hill Mission Church in the parish of Taynton, Glos., 10*l*. The following grants were also paid for works completed:—Crossland Moor St. Barnabas, near Huddersfield 900*l*. on account of a grant of 1,000*l*.; East Ham St. Bartholomew, Essex, 750*l*. on account of a grant of 1,000*l*.; Plumstead St. Mark, Kent, 500*l*. on account of a grant of 1,000*l*.; Gorehill St. James, near Rotherham, Yorks, 40*l*.; Landulph St. Dilphe and St. Leonard, near Hatt, Cornwall, 50*l*.; Friern Barnet St. John, Middlesex, 140*l*. on account of a grant of 175*l*.; West Dereham St. Andrew, near Downham Market, Norfolk, 15*l*. on account of a grant of 25*l*.; Witton-le-Wear St. Philip and St. James, Durham, 50*l*.; and Leyton Christ Church, Essex, 100*l*. In addition to this the sum of 203*l*. was paid towards the repair of fourteen churches. The Society likewise accepted the trust of a sum of money as a repair fund for Holy Trinity Church, Marylebone, Middlesex.

ST. BARTHOLOMEW THE GREAT, WEST SMITHFIELD.—Adverting to our recent "Note" upon the proposed rescue from destruction of the remains of the cloisters, we may mention that on December 12 last a petition was brought before the Consistory Court of London by the rector and churchwardens. In the result, Dr. Tristram, K.C., Chancellor of the Diocese, agreed to grant a faculty to sanction an agreement for the purchase of certain stables and land abutting on the south-western corner of the church for the purpose of reclaiming a portion of the alienated cloisters and of protecting the church from the risk of fire. Three bays of the cloister stand on the property of which the petitioners expect to secure the reversion, and when possession has been obtained they propose to connect the property with the church by means of the original cloister doorway, and to stipulate (with other provisions) that some new buildings which the owners of the adjoining property are about to erect shall be kept some 19 ft. away from the church. The price to be paid for the land is 684*l*., which includes the purchase of a ground-rent of 12*l*. per annum, and it is hoped that, by negotiation, possession will be obtained before the expiration in 1926 of the current lease of the premises. The stables, which contain the cloister arches, are now 7 ft. above the original level of the church. It was stated in court that a sum of 33,000*l*. has been expended during the last few years upon the restoration and rehabilitation of the fabric. The faculty will sanction the construction, from the height of 30 ft. to 52 ft., of four lights on each of two storeys of some buildings in the Close and overlooking the churchyard, and a covenant will be made to prevent the erection of any building against the tower.

CHURCH OF ST. MATTHEW, CITY-ROAD.—A faculty will shortly be issued for enlarging the chancel, changing the position of the organ, choir vestry, and pulpit, and for other alterations and improvements, at an estimated cost of 1,100*l*. The church was built, for 800 sittings, after Sir G. G. Scott's plans and designs, and consecrated on April 11, 1848. It is distinguished by a fine steeple, and contains some good stained glass in a pair of lancets above the west window (by Clutterbuck), and in the east window (by Michael O'Connor, 1866). In 1866 Street improved the chancel and sanctuary, extended the porch, and made designs for the reredos.

CHURCH OF ST. GEORGE, CAMPDEN HILL.—A faculty has been granted by the Consistory Court to authorise the carrying out of some alterations and improvements of this church. The new works will include a side chapel for the use of small congregations. The church was built, upon the summit of Campden Hill, in 1863-4, after plans and designs in the French Gothic style by Keeling, and has sittings for 1,100 worshippers.

CHAPEL OF ST. PHILIP, REGENT-STREET, S.W.—Application will be made in the ensuing Session for leave to bring in a Bill for the compulsory extinguishment of all existing interests in the chapel, with its pews, vaults, and cellars, now enjoyed by any persons other than the trustees, and for the vesting of the chapel and its site in the trustees solely. The Bill will also empower the trustees—the Bishop of London and the Rector of St. James's, Westminster (who is patron of the incumbency)—to sell and dispose of the chapel and its site, and provides for the payment of the purchase moneys to the Ecclesiastical Commissioners, who will deal with claims for compensation arising out of the extinguishment of such existing interests. The chapel was erected in 1819-20, at a cost of about 15,000*l*., after G. S. Repton's plans and designs. The building is conspicuous for its Classic portico, and a tower copied from the Choragic Monument of Lysicrates in the street of the Tripods at Athens, which is often, albeit erroneously, called the Lantern of Demosthenes. The west façade carries the, perhaps, strictly classical, but somewhat incongruous, sacrificial emblems of the skulls of oxen.

A MECHANIC'S ALMANAC.—We have received the thirtieth annual issue of Calvert's Mechanics' Almanac, a cheap little publication (4d.) which contains an almanac bound up with a good many short papers on practical subjects; tables of strengths, working loads, notes on gearing, belting, and many other subjects of mechanical interest.

POLYTECHNIC SCHOOL OF ARCHITECTURE.—On the 19th inst. Mr. Thomas Blashill presented the medals, book prizes, and certificates awarded by the Science and Art Department and the Board of Education to the successful students of the Polytechnic School of Architecture. Mr. Edward White, L.C.C., who presided, congratulated the pupils, not only on their successes, but on the excellent teaching which they must have received. During the past session the number of attendances at the school reached the gratifying total of 47,216, a steady increase as compared with previous years. Among the recent successes are twelve honours science passes, eight national prizes, and silver medals for carpentry and joinery, masonry and brickwork, given by the City Guilds and the Carpenters' Company, and four out of the seven silver medals awarded by the Royal Academy schools. Through the instrumentality of Mr. Alfred Waterhouse, R.A., President of the school, and other Fellows of the Royal Institute of British Architects a series of visits had been made by the students to the new Roman Catholic Cathedral at Westminster, the Post Office Bank buildings in Addison-road, and other large buildings in progress, for the purpose of enabling the latest phases of construction to be seen under the best conditions, while actual examples of Greek and Roman art had been inspected at the British Museum. One of the students obtained first place in the October open competition for draughtsmen in the surveying branch of the Board of Agriculture; in the two most recent examinations held by the Royal Institute of British Architects, twenty-one, six, and four places in the preliminary, intermediate, and final stages respectively have been awarded to present or past Polytechnic students; and as showing the importance attached by the L.C.C. to the school, the value of the scholarships granted by that body to the students now in attendance amounts to 170*l*.—*Morning Post*.

ARCHITECTURE AND ART IN AUSTRALIA. — In regard to the position and employment of architects and artists in Australia, the *Year-Book of New South Wales* says:—"There appears to be a strange fascination in the study of architecture, for the number of architects in New South Wales is out of all proportion to the demand for their services, despite the

steadily increasing activity in the building trades. Most of the Australian architects have travelled a great deal, and have comparatively little to learn. They all have pupils of more or less promise, and many others are receiving instruction in the Sydney Technical College or in private classes. Hence professional architects intending to settle in the colony would find the ground almost wholly covered. Even in interior decorative work there is no lack of designers or artists, but the expenditure in this direction in Australian buildings is comparatively limited. Stained glass is mostly imported, but some is manufactured locally, although not to an extent sufficient to encourage the immigration of designers or skilled workers." In regard to art generally, the *Year-Book* continues:—"Although a taste for art is being rapidly developed in New South Wales, it has not reached that point at which it becomes the custom of the opulent classes to decorate the walls of their mansions with pictures specially painted for them, their expenditure being chiefly in the direction of costly artistic furniture and interior decoration. There are numerous teachers of drawing, painting, and the decorative arts, in Sydney and the leading cities and towns, but few obtain more than a modest competence. In Sydney there is an art society annually subsidised by the Government, several hundred works in oil and water-colour being displayed at the periodical exhibitions, but the number sold at even moderately remunerative prices is limited; hence there is a tendency on the part of the more talented members to quit the State and seek their fortunes in Europe or America.

ANGULAR DRILLING APPLIANCE.—The "Kinemat Apparatus" is a simple and ingenious device for rapidly boring or drilling square and other angular holes in materials such as steel, iron, brass, wood, and stone, and it can easily be attached to any drilling machine or lathe. We have recently inspected an example of this invention as applied to a drilling-machine, and can therefore vouch for the facility with which square and other polygonal holes may be drilled in metal. In the ordinary way the most general method of making a square hole in metal is to drill a round hole, afterwards cutting or filing away material to secure the desired rectangular form. Punching-machines may also be employed, but the work performed by them is not particularly accurate, and punching is naturally suitable for ductile metals. The slotting machine is another useful aid for the formation of rectangular or polygonal holes, but the slotting process is necessarily slow and costly. In consequence of the trouble and expense attaching to the cutting of angular holes they are usually avoided as far as possible in engineering work, sometimes when their employment would be attended with distinct advantage. By the aid of the apparatus to which we now direct attention, square holes can be drilled as easily and as cheaply as round ones. The Kinemat apparatus comprises a clamp which is fitted to the spindle-bearing of a drilling machine, at the end of the clamp is fixed a drill-guide furnished with adjustable cheeks which partly control the size and form of the hole to be drilled. On the head of the drill spindle a cross-head is attached by screws, and on two friction rollers secured thereto, another crosshead is carried into which the drill is screwed. The latter crosshead, revolving with the drill, is free to move backwards and forwards in a horizontal direction, the movement being governed by the shape of the opening formed by the cheeks in the drill-guide, and by the form of the drill shank. Thus the drill continually changes its position with regard to the centre axis of the spindle, with the result that the cutting edges of the drill follow a course precisely coinciding with the form of the hole presented by the drill-guide. When the apparatus is used in connexion with a lathe the drill is attached to the spindle of the poppet-head, the clamp and drill-guide are bolted to the face-plate, on which also is secured the work to be drilled. The invention is already being manufactured and used on the Continent, and it was awarded a gold medal at the Nuremberg Exhibition this year.

LEGAL.

STRAND IMPROVEMENT SCHEME—INSANITARY PROPERTY.

MR. CORRIE GRANT, on the 19th inst., moved, before a Divisional Court of King's Bench, composed of Mr. Justice Lawrance and Mr. Justice Ridley, on behalf of the London County Council, for a rule for a mandamus directed to the High Bailiff of Westminster requiring him to summon a jury to determine the compensation to be paid to two claimants—Miss Elizabeth S. Burgess and Mrs. James Cross.

Mr. Grant said the point was whether the claimants could take the secret offer of the Council after the jury had given a part of their verdict. Under the Lands Clauses Act the promoter of an undertaking was bound to give to the claimants a sealed offer, such offer not to be disclosed to the sheriff—in this case the High Bailiff of the Liberty of Westminster or the jury. The reason of that was that, if the jury awarded the same or a less sum than that contained in the sealed offer, then the claimants were to bear half the costs of the inquiry. The case had never yet been decided up to what point a claimant could go in the proceedings and then stop and take the sealed offer. In this case the London County Council, by the London County Council Improvement Act, 1899, were authorised amongst other things to make a new street from Holborn to the Strand, and were empowered to take a house, No. 19, Vere-street. Notice had been served upon the claimants to treat the property as insanitary. The jury found the property to be insanitary, and the claimants then desired to accept the sealed offer and the High Bailiff stopped the proceedings. The London County Council objected and, considering the question one of importance, applied for a rule.

Their Lordships granted the rule *nisi* asked for.

SERIOUS REVERSE FOR A TRADES UNION.

THE hearing of the case of the Taff Vale Railway Co. *v.* the Amalgamated Society of Railway Servants and others concluded before Mr. Justice Wills and a special jury in the King's Bench Division on the 10th inst.

The action was brought by the Taff Vale Railway Co. against the Amalgamated Society of Railway Servants, Richard Bell M.P., its General Secretary, James Holmes its Organising Secretary, Philip Hewlett, George Alcock, and John Pilcher, the Trustees of the Society. The plaintiff Co. claimed damages against all the defendants (except the trustees) for maliciously and unlawfully conspiring together to molest and injure the plaintiffs in their business, and for maliciously and wrongfully procuring certain of the plaintiffs' servants to break their contracts of service with the plaintiffs, and for maliciously and wrongfully watching and besetting the plaintiffs' works and approaches thereto and the places of residence of the workmen employed by plaintiffs or proposing to work for the plaintiffs, and divers other places, including the Great Western Railway station at Cardiff, and for using violence and intimidation towards the plaintiffs and their servants, and for preventing persons from working for the plaintiffs and for otherwise committing violation of the legal rights of the plaintiffs. The plaintiffs also claimed an injunction restraining a repetition of any of the before-mentioned acts. The claim arose out of the alleged connexion of the defendant Society and its officials with a strike on the plaintiffs' railway in August, 1900, whereby it was alleged that the plaintiff company had suffered a loss of some 28,000*l*.

The trial lasted several days, and in the result the jury, in answer to questions left to them by the learned judge, found that the defendants did conspire together to molest and injure the plaintiffs by unlawful means; that all of the defendants did unlawfully persuade the men whose notices had not transpired to break their contracts; and that all of them authorised and assisted in carrying out the strike by unlawful means.

The assessment of damages was left by consent to the Judge, and this question, together with the questions of law were ordered to stand over till next term, the present injunction being continued until the further consideration.

Sir Edward Clarke, K.C., Mr. B. Francis-Williams, K.C., Mr. Eldon Bankes, K.C., and Mr. Holman Gregory, represented the plaintiffs; Mr. Rufus Isaacs, K.C., Mr. S. T. Evans, K.C., Mr. Edmond Browne, and Mr. A. Clement Edwards, represented the defendant Society, Mr. Richard Bell, M.P., and the trustees; and Mr. Abel Thomas, K.C., Mr. Ivor Bowen, and Mr. Morgan Morgan represented the defendant, James Holmes.

NORTH WALES BOUNDARY-WALL DISPUTE.

THE case of Mellor *v.* Heenan came before the Court of Appeal composed of the Master of the Rolls and Lords Justices Romer and Mathew, on the 19th inst., on the appeal of the defendant from an order of Mr. Justice Darling granting an interim injunction restraining him from proceeding with the erection of a boundary-wall, which he had commenced, till the trial of the action or further order.

Mr. W. H. Upjohn, K.C. (with him Mr. Hewitt), in support of the appeal, said that the plaintiff and the defendant were the owners of adjoining property at Colwyn Bay, North Wales. The defendant had just completed some additions to and alterations of his house, and he proposed to occupy the house himself. The house on the adjoining property was used as a lunatic asylum, and the defendant provided, not unnaturally, in the contract with his builder, that there should be a fairly high wall between his property and the plaintiff's. Before starting the wall the defendant communicated with the plaintiff, and the evidence was that there was a meeting on August 16, at which an agreement was come to between them as to the exact site the wall was to occupy. That agreement was acted upon by the defendant, and the wall, which was to be about 10 ft. high, had, when this injunction was obtained, reached about 4 ft. Previously, a quick-set hedge had divided the property, and on the plaintiff's side of the hedge there was a ditch. That ditch had been filled up some time ago by persons on the plaintiff's side, and communication between the parties commenced with a complaint by the defendant of the filling up of the ditch and the use by the plaintiff to some extent of the site of the ditch. The plaintiff did not deny that the ditch had been filled in, but said that the act was done because the defendant's predecessors in title had been negligent. The hedge had always been trimmed by the defendant's predecessor's gardener. On August 16 the plaintiff went with the defendant and the builder's foreman to examine the site. A site was staked out so as to have a straight wall, and it passed over the site of the hedge where possible. Certain outbuildings and a fir tree the plaintiff required should remain on her side of the wall, and the site was so staked out as to provide for this, thus for some distance giving the plaintiff some 2 or 3 ft. of land which in fact formed part of the defendant's property. The erection of the wall was proceeded with shortly afterwards, and everything went on perfectly well until the plaintiff came across her solicitor, who seemed to have persuaded her that she was being badly treated, and the writ in the action was issued on December 4 last. Since then the injunction to which the defendant now objected was obtained restraining him from proceeding with the erection of the wall until the action was disposed of. The defendant wished to move into his house with his family, but he could not do so until there was a suitable screen between his garden and the garden of the lunatic asylum. There was no reason why the defendant should not go on with the wall, and he would undertake that if at the trial he was ordered to pull it down he would do so.

In the result their lordships, after hearing Mr. Ellis Griffiths on behalf of the plaintiff discharged the injunction on the defendant giving the undertaking to pull down if ordered to do so at the trial, the costs of the appeal to abide the result of the trial.

Lord Justice Mathew suggested that the learned counsel should try and get the authority of their respective clients to come to some amicable arrangement. He said it would be deplorable if such a case as this had to be fought out.

APPLICATION AGAINST A RAILWAY FOR WORKING SO AS TO CAUSE A NUISANCE.

THE case of Roberts *v.* The Charing Cross, Euston, and Hampstead Railway Co. came before Mr. Justice Swinfen Eady in the Chancery Division on the 19th inst. on an application by the plaintiff for an interim injunction to restrain the defendant Company from working through the night.

It appeared that the plaintiff was the lessee and occupier of No. 186, Haverstock-hill, N.W., which is contiguous to the place where the defendant Company are constructing their Belsize Park Station. The plaintiff's case was that a crane was working day and night continuously for the purpose of hauling out excavated material, and letting down material for the construction of the station, lifts and railway, and that the noise was a great nuisance, the steam crane being worked within a few feet of his bedroom. The defendants, by their defence, relied on their statutory powers, and said that it was absolutely necessary for them to work day and night, and that the nuisance having been authorised by Act of Parliament, the plaintiff's remedy was for damages under Section 68 of the Lands Licences Act.

In the result his lordship refused to grant an interim injunction, but directed the motion to stand over till the trial. He ordered that the action should be expedited, and put the parties on terms to deliver pleadings within a limited time, in order that the action could be tried at the earliest possible moment—probably early next sittings.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

15,887.—MEANS OF TESTING DRAIN-TRAPS: *W. Riley.*—Testing operations are rendered easier by means of a seating for a plug, which is formed near the inlet of the trap. The eye of the trap is set horizontally, and is closed with a plug which has a sealing-flange. The seat of the latter plug is shaped as a cone.

16,847.—A SUPPORT FOR INCANDESCENT LAMPS: *R. O. Wright.*—For a hanging lamp-holder is devised a supplementary cord grip. Two screws clamp two grooved blocks on the conducting cord, metallic strips or wires join the blocks to a ring, or part of a ring, attached by the customary shade-holding nut on the lamp-holder, so that the ordinary cord-grip in the lamp-holder is not needed. In a modified adaptation, the top of the lamp-holder is fitted with two zig-zag grooved blocks screwed or bolted on to the cord.

16,864.—SOLDERING OF ALUMINIUM ARTICLES: *C. P. Sörensen.*—A concentrated lye of soda or some such alkali is applied to the work, which is heated to about 300 deg. C., and is then washed clean in cold water, when no flux or other material will be needed during the soldering. The inventor says that a brazing alloy of brass or tin filings and zinc may be advantageously used.

16,871.—HOT-WATER APPLIANCES (DOMESTIC): *W. Haighton and J. Cornes.*—The oven on one side of the grate faces one room, say, a kitchen, whilst the boiler on the other side faces another room, say, a washhouse or scullery, which contains a

bath. The boiler may be heated with a separate grate underneath it or the flames may be conducted around both the oven and the boiler; a water cistern fills the boiler and is connected with the bath. The inlet and outlet is placed at some height above the bottom of the boiler. The apparatus is intended for tenements, cottages, and similar buildings.

16,885.—A SUBSTITUTE FOR WOODEN PARQUETRY: *A. Litzler*.—An imitation parquetry flooring consists of a compound of casein, 45 parts; sal-ammoniac or chalk, 25 parts; camphor, 5 parts; wood ashes or magnesia, 15 parts; linseed oil, 5 parts; and colouring matter, 5 parts, which is pressed and rolled into plates.

16,911. — PLUG AND SOCKET CONNEXIONS (ELECTRICAL): *F. W. Heaton and H. Smith*.—The inventors provide that the parts shall quickly spring apart whenever the circuits are opened. In one form springs force back the plugs, which slide in tubes. A casing, having a removable lid and a hinged door, encloses the base. When the door is open the movable part that carries the socket is inserted and a projection from the door holds it in position; when that part has been drawn out the plug is drawn out with it until it is snapped back again by the spring as the latter overcomes the friction. In another shape the sockets are fitted with springs or are spring-controlled, and the plugs are fixed.

16,916.—TILES FOR ROOFS: *W. B. Heap*.—Both surfaces of the tiles, which are curved lengthwise, have cross ratchet ribs, or recesses and ribs, in order that one may lay them with variation of the amount of over-lap, and with breaking joint with the courses above and below, whilst inclined or V-shaped interlocking ribs and recesses obviate any movement side-ways of the tiles.

16,923.—AN APPLIANCE FOR GAS-METERS: *G. E. Wright and A. G. Sutherland*.—A small diaphragm head is devised for a diaphragm or dry meter, and is placed concentrically on a flexible flat disc of skin, leather, or other material, which is clamped between a stationary ring and a loose metallic band so as to secure it to a rigid neck, a beading being made over the outer end upon the band for clamping purposes.

16,930.—A PAINT REMOVER: *G. Willock*.—For removal of paint from woodwork and other surfaces; the compound is made up of soft soap, glycerine, caustic soda, and lime.

16,935.—AUTOMATICAL TACKLE AND LOAD-SUSPENDING GEAR: *R. Skene*.—A brake-drum that rotates in a wedge-shaped hollow between two blocks is mounted on the shaft of the chain wheel. From the cross-head of a lever which is journalled on the shaft hang slotted links that carry rollers which will jam between the drum and the block, for hanging the load, when the lever arm is in the middle position. The pulling aside of the arm with a rope liberates the roller upon the jamming side, and the load will then be lowered. An oval pin, working between the free ends of brake-blocks, which a spring normally forces together, may, in some cases, be fitted at the upper end of the lever arm.

16,950.—A COMBINED WALL-PLUG AND SWITCH: *T. H. Marsh and O. D. Lucas*.—A drum for the switch-mechanism is set inside a base or block, and carries a bridging-piece for the connexion of plunger contacts. A push-rod sliding in the base carries a pawl for turning the drum by means of its ratchet teeth. A snap action is effected through the engagement of a spring with one of the four faces of an extension from the drum. The base and socket part of a wall-plug is adapted to hold the switch, and has terminals and sockets for the plungers and the plug.

16,954. — TOPS FOR VENTILATING-SHAFTS AND CHIMNEYS: *F. Keane*.—A squared head has outlets at its corners, and in the space between its sides and a middle tube are set some radial and oblique baffles. In a variant shape the head is made with a cross-shaped section adjusted to openings in the inner tube or pipe, and is fitted with baffles arranged horizontally.

17,016.—A STOVE FOR USE WITH HOT-WATER APPARATUS: *R. Herzberg*.—Closely-coiled pipes placed against the walls of the combustion-chamber and other pipes set along or across that chamber conduct the water. A hopper, roller, and jet supply the fuel which the latter pipes distribute evenly over the grate, and there are channels for heating the air supply for combustion.

17,056.—FLUSHING APPARATUS: *R. G. Hanson*.—The flushing-pipe is trapped at its lower end and has an upper pipe open to the outer air. Another pipe communicates between the flushing-pipe and the crown of the principal siphon beneath the closet-basin; the flushing action is started by the exhaustion of air from the latter siphon through the pipe in its crown.

17,070.—INCANDESCENT LAMPS AND FILAMENTS: *A. L. Reinmann*.—Loops or cemented joints on wires support the filament at one point or more in its length. In the glass base of the lamp is set a middle stem of wire that carries a glass bead, in which the first-named wires are fused. In one form glass or some such equivalent material may be used for the middle stem, and that stem can be utilised for holding up the filament at its middle point.

17,080.—MEANS OF FEEDING CIRCULAR SAWS: *N. Tasiby*.—Friction gearing serves to vary the rate of speed of a radial feed appliance. Bevel gearing drives a disc at a constant rate of speed from a belt pulley. A worm-shaft carries a friction wheel, around which are springs that bear against the face of the disc. A screw and nut wheel regulate the distance of the friction wheel from the centre of the disc.

17,101.—A COMBINED SINK AND WASHTUB: *W. F. Minns*.—The sink, which is flanged at the back to obviate splashing, is hinged in order that it may be turned up out of the way, and the outlet is directed into a stand-pipe that acts as a waste. A draining-board is fitted over the other division of the tub.

17,106.—A GUARD FOR KEYHOLES: *L. Lacroix and H. Brisselet*.—A cover that turns about a pivot-pin is pivoted on to a base-plate, which is pierced for the key of the lock, and is fastened to the door, &c. A sliding bolt, having a hook in engagement with a recess cut in the base-plate, locks the cover when in the closed position. Projections from the cover engage with grooves in the bolt, and springs on the cover that engage with notches on the bolt keep the bolt in the locked position. The springs are forced back for releasing the bolt with a key having grooves and projections which register with those on the bolt and the cover. A spring disengages the bolt from the base-plate. For an easy removal of the cover, its pivot-pin can be joined to the base-plate by fashioning the end of the pivot as a key that engages with a hole in the plate when the cover is turned off the face of the plate.

17,148.—A FASTENING FOR FRENCH WINDOWS, DOORS, &C.: *W. Crich*.—The appliance comprises plates with top and bottom pieces interposed, and a lever pivoted between the plates, at one end of which is a knob and a hook at the other. The hook is kept in engagement with the catch with a spring, and becomes disengaged when the knob is pressed downwards. A shield or plate affixed to the door, &c., is slotted for the working of the lever. The contrivance, of which there are other adaptations, is described as being available for a single door, or for double doors that interlock.

17,193.—A CONTRIVANCE FOR CUT-OUTS AND SWITCHES: *E. M. Hewlett*.—In order to minimise arcing the inventor encloses the main contacts or auxiliary or sparking contacts in a chute and subjects them to a field formed by the arc and contacts; impedance is thereby lowered and blow-out coils are discarded. In one form for a cut-out a toggle which will be tripped up by means of an armature under the influence of a coil upon one of the contacts holds up the bridging-piece. A chute made of iron plates joined with a cross-piece encloses the main contact and the auxiliary contacts as well. In the case of very heavy currents the iron-plates need not be used, as the conductors, &c., will set up the field. An additional contact is fitted near the outer portion of the chute so that the arc shall not be expelled downwards.

17,217.—A BAND HINGE FOR GATES AND DOORS: *F. Doman*.—The band, or strap, is joined to a double conical pin. When the screws are slackened, one can turn back the top socket and then raise the pin out of the bottom socket. Various other forms of the pin and the top socket are specified.

17,272.—DIFFERENTIAL GEARING FOR HOISTING-CHAINS, &C.: *W. F. Jenkins*.—The object of the invention is to automatically equalise the tension in a pair of driving-chains. A fixed and a loose sprocket-wheel are carried by a shaft that is turned with a spur-wheel, upon the diameter of which are mounted two pinions which engage on one side with a bevel-wheel upon the shaft, and on the other side with a bevel-wheel secured to the loose sprocket-wheel, so that the loose sprocket-wheel is thereby free to move in respect of the shaft until the tension on the two chains has become equalised.

17,296. — PROCESS OF MOULDING TILES FOR ROOFS: *H. Strube*.—The frames that carry the moulds are independently mounted upon a middle pivot, and their rollers run upon a round track or table. A workman fills the moulds, and takes out the moulded tiles at one side of the table. Another workman at the other side finishes, colours, and oils them. A profile-bar linked to the mould, and held up by a projection from a lever, rounds off the front edge of the tile. Spring catches or handles fasten the frames to the table.

17,310.—STOVES FOR COOKING PURPOSES: *G. L. Scott*.—A gas or oil burner is put at the base of a heating-chamber in the casing of the stove. Flues convey the products of combustion around the oven, suitable inlets and outlets being provided. The heating-chamber can be placed either between an oven and a boiler or between two ovens.

MEETINGS.

SATURDAY, DECEMBER 27.

Royal Institution.—Professor H. S. Hele-Shaw on "Locomotion: on the Earth, through the Water, in the Air." I. 3 p.m.

TUESDAY, DECEMBER 30.

Royal Institution.—Professor H. S. Hele-Shaw on "Locomotion: on the Earth, through the Water, and in the Air." II. 3 p.m.

THURSDAY, JANUARY 1.

Royal Institution.—Professor H. S. Hele-Shaw on "Locomotion: on the Earth, through the Water, and in the Air." III. 3 p.m.

FRIDAY, JANUARY 2.

Institution of Junior Engineers.—Mr. H. M. Rounthwaite on "Marine Boilers: a Consideration of the Relative Values of Different Types." 8 p.m.

SATURDAY, JANUARY 3.

Royal Institution.—Professor Hele-Shaw on "Locomotion: on the Earth, through the Water, and in the Air." IV. 3 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

December 11.—By STIMSON & SONS.

Bermondsey.—4, 5, and 6, Alfred-st., u.t. 13¾ yrs., g.r. 9*l.* 12*s.*, w.r. 10*9l.* 4*s.*	£340
Old Kent-rd.—Herman-rd., warehouse premises and yard; also 1, Rodsley-st., u.t. 3¾ yrs., g.r. 3*l.*, y.r. 138*l.*	463
Holloway.—106, Marlborough-rd., u.t. 73¾ yrs., g.r. 6*l.* 6*s.*, w.r. 54*l.* 12*s.*	420
Highbury.—30 and 32, Highbury New Pk., u.t. 46¾ yrs., g.r. 27*l.*, e.r. 170*l.*	1,060
Catford.—22, Honley-rd., u.t. 70 yrs., g.r. 6*l.* 10*s.*, e.r. 45*l.*	450
Bermondsey.—60 and 62, Lerov-st., f., w.r. 6¾*l.* 14*s.*	900
Leytonstone.—49, Union-rd. (S), u.t. 90 yrs., g.r. 7*l.* 7*s.*, y.r. 36*l.*	295

December 11 and 12.—By BEAUMONT & GLOVER (at Wakefield).

Crigglestone, &c., Yorks.—The Chapelthorpe Estate, area about 1,040 acres, f. (in numerous lots)	37,176

December 12.—By H. P. ANLEY & CO.

Tottenham.—Earlsmead-rd., f.g.r. 5*l.*, reversion in 83¾ yrs.	122
Brixton.—353, Brixton-rd., u.t. 49 yrs., g.r. 15*l.* 10*s.*, y.r. 80*l.*	720

By BELLHAM, WILLIAMS, & CO.

Wimbledon.—24, Southey-rd., f., y.r. 36*l.*	550

By C. H. BROWN.

Tottenham.—205, Park-lane, u.t. 61 yrs., g.r. 6*l.*, y.r. 20*l.*	175

By FRANCIS DOD & CO.

Stoke Newington.—16, Darville-rd., u.t. 70¾ yrs., g.r. 7*l.*, e.r. 45*l.*	425
Clapton.—50, Avenue-rd., f., e.r. 36*l.*	470
Hornsey.—31 and 33, Campsbourne-rd., u.t. 74 yrs., g.r. 12*l.*, w.r. 88*l.* 8*s.*	450

By EDWIN EVANS.

Willesden.—74 to 96 (even), Deacon-rd., u.t. 96 yrs., g.r. 84*l.*, w.r. 60*8l.* 8*s.*	3,560
Chiswick.—2 to 10 (even), 14 and 16, Quick-rd., and 27 to 45 (odd), Fraser-st. u.t. 65¾ yrs., g.r. 76*l.* 10*s.*, w.r. 53*l.* 12*s.*	3,000
Bermondsey.—34 and 36, Ambrose-st., u.t. 34 yrs., g.r. 8*l.*, w.r. 76*l.* 14*s.*	430

By OGDEN, SONS, & OLLEY.

Fulham.—Star-rd. f.g.r. 16*l.*, reversion in 29 yrs.	495
Fane-st., f.g.r. 12*l.*, reversion in 90 yrs.	275

By A. J. SHEFFIELD.

Stratford.—24, Water-lane, and 57, Manby-gr., with stable premises, &c., adjoining, u.t. 81¾ yrs., g.r. 5*l.*, y.r. 54*l.*	740

December 15.—By DRIVERS'.

Finsbury Park.—110 to 126 (even), Palmerston-rd., u.t. 63¾ yrs., g.r. 47*l.* 5*s.*, w.r. 327*l.* 12*s.*	1,950
71, Lennox-rd. (S), u.t. 62 yrs., g.r. 6*l.*, y.r. 52*l.*	550

By KUTTERS'.

Tooting.—177, Longley-rd., f., p.	600
Cowleaze, Isle of Wight.—The Lynch and 1 a. 1 r. 16 p., u.t. 982 yrs., g.r. 2*l.*, p.	300

By SELFE, BALL, SMITH, & CO.

Battersea.—9 and 17, Ilminster-gdns., u.t. 77¾ yrs., g.r. 16*l.* 8*s.*, y.r. 84*l.*	950

By GEO. STOCKINGS.

Caterham, Surrey.—Chaldon-rd., Park House, f., y.r. 35*l.*	530
Beechwood-rd., a freehold building site, 1 a. 2 r. 8 p.	390

December 16.—By CHINNOCK, GALSWORTHY, & CO.

St. James's.—69, Jermyn-st. (S.), u.t. 16 yrs., g.r. 36*l.*, y.r. 180*l.*	1,480

By DEBENHAM, TEWSON, & CO.

Barnet, Herts.—Mayes-lane, Moxons building estate, 20 a. 0 r. 7 p., f., *P.*	3,500
Chiswick.—Turnham Green-ter., Leigh House, f., *P.*	2,000

By DAVID BURNETT & CO.

Willesden.—Shrewsbury-rd., f.g.r.'s 56*l.*, reversion in 77 yrs.	1,340

By W. B. HALLETT.

Finchley.—39, 41, 43, and 45, Park Hall-rd., u.t. 80 yrs., g.r. 25*l.* 4*s.*, y.r. 135*l.*	1,320
49, Park Hall-rd., u.t. 85 yrs., g.r. 7*l.*, y.r. 44*l.*	440

By HIBBARD & WHITTINGHAM.

Wood Green.—Coburg-rd., f.g.r. 16*l.*, reversion in 79 yrs.	395
Palmers Green.—Meadowcroft-rd., a plot of building land, f.	120
Stoke Newington.—Albion-rd., f.g.r. 7*l.* 10*s.*, reversion in 64 yrs.	200
71, Church-st., u.t. 34¾ yrs., g.r. 5*l.* 9*s.*, y.r. 55*l.*	580

By MATTHEWS, MATTHEWS, & GOODMAN.

Tottenham.—30 to 52 (even), Avondale rd., and 1 to 11 (odd), Clarendon-rd., u.t. 85 yrs., g.r. 81*l.*, w.r. 51*4l.* 16*s.*	3,200

By RICHARD SMITH & CO.

Edgware-road.—No. 45 (S), u.t. 14¾ yrs., g.r. 9*l.*, y.r. 200*l.*	725

By WARNER, SHEPPARD, & WADE (at Leicester).

Desford, &c., Leic.—The Shericles Farm, 127 a. 2 r. 18 p., f., y.r. 172*l.* 5*s.*	2,680

By R. GREY & SONS (at Whitby).

Sleights, Yorks.—Freehold closes of land, with freestone quarry, 34 a. 0 r. 24 p., y.r. 16*l.*	750
Eskdaleside, York.—Freehold farmhouse and 31 a. 2 r. 35 p., y.r. 16*l.*, with common rights	700

By ORGILL, MARKS, & LAWRENCE (at Masons' Hall Tavern).

East Ham.—High-st. North, the Cock Hotel, u.t. 52 yrs., y.r. 100*l.*, with goodwill	35,000

CONTRACTS, COMPETITIONS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
Designs for University Buildings, Cape of Good Hope	Agnt.-Gen. for Cape of Good Hope	400*l.*, 200*l.*, 100*l.*	Jan. 31
*Proposed Town Hall, &c.	Chipping Wycombe Corporation	100 guineas and 25 guineas	Mar. 4
*Extension of Town Hall	Hull Corporation	300*l.*, 200*l.*, and 100*l.*	Mar. 31
*New Free Library	Kettering U.D.C.	60*l.*, 40*l.*, and 25*l.*	No date

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Sewage Outfall Works	Wealdstone U.D.C.	C. N. Lailey, Civil Engineer, 6, The Sanctuary, Westminster	Dec. 30
Street Works, &c.	Sale U.D.C.	W. Holt, Engineer, Council Offices, Sale	do.
Timber for one year	Oxford Corporation	City Engineer, Town Hall, Oxford	Dec. 31
*Water Supply at Union Workhouse, Saunderton	High Wycombe Guardians	Not stated	do.
Street Improvement Works, Clarendon-rd., Didsbury	Withington U.D.C.	A. H. Mountain, Civil Engineer, Town Hall, Withington	do.
Road Metal, &c., Horsham	West Sussex County Council	W. B. Purser, Civil Engineer, 4, Worthing-road, Horsham	do.
Twenty-seven Artisans Dwellings	North Dublin R.D.C.	J. O'Neill, North Brunswick-street, Dublin	do.
Paving Works	Blackpool Corporation	J. T. Brodie, Borough Surveyor, Town Hall, Blackpool	do.
Well Sinking, Heybridge	Maldon Hospital Board	P. M. Beaumont, Engineer, Maldon	do.
Iron Fencing (4 miles)	.....	D. Grant, Grantown, N.B.	Jan.
House, Glenville, Co. Cork	.....	S. F. Hynes, Architect, 21, South Mall, Cork	do.
Pipe Trench, &c., The Green, Tyseley	Bilston U.D.C.	J. P. Wakeford, Civil Engineer, Town Hall, Bilston	do.
Water Supply Works	Penygroot (Wales) R.D.C.	J. & F. J. Burley, Engineer, 10, Bridgend-road, Tonda	Jan. 2
School Superstructure, Linacre-lane	Bootle (Lancs) School Board	T. Cox, Architect, 11, Dale-street, Liverpool	do.
Street Works	Wakefield Corporation	City Surveyor, Town Hall, Wakefield	Jan. 3
Road Works, Undercliff-road, East	Felixstowe U.D.C.	S. E. Fisher, Surveyor, Town Hall, Felixstowe	do.
Rebuilding Goody Bridge, Westmoreland	Grasmere U.D.C.	J. Bintley, Architect, 7, Lowther-street, Kendal	do.
Rebuilding Melbourn Bridge, Haverhill	West Suffolk County Council	A. A. Hirst, County Surveyor, Sudbury	do.
Works at Schools, Bridlington	.....	J. Woodmansey, 24, Cambridge-street, Bridlington	do.
Sewerage Works (contract 4)	Bispham (Lancs) Town Council	A. Hindle, Civil Engineer, 44, Abingdon-street, Blackpool	Jan. 5
Pipes, &c.	do.	do.	do.
Pier Works	Falmouth Town Council	W. H. Tresidder, Borough Surveyor, Falmouth	do.
Laying Cast Iron Water Pipes (2 miles)	Kettering U.D.C.	T. R. Smith, Engineer, Market-place, Kettering	do.
Sewage Disposal Works	Tring U.D.C.	Wilcox & Raikes, Engineers, 3, Temple-row, Birmingham	do.
*Engine and Boiler House, &c. (Electricity Works)	Clacton U.D.C.	W. H. Trentham, 30, Victoria-street, S.W.	do.
Street Works, Spring Bank, &c.	Waterloo (Lancs) U.D.C.	F. S. Yates, Engineer, Town Hall, Waterloo	Jan. 6
Road Works, Hounslow	Heston U.D.C.	F. G. Parkman, Civil Engineer, Town Hall, Hounslow	do.
Additions to Victoria Infirmary, Northwich	.....	J. Holland, Architect, Baythur.t-street, Northwich	do.
Tramway Works	Lowestoft Corporation	W. C. C. Hawtayne, Engineer, 9, Queen Street-place, E.C.	Jan. 7
*Building for Bakery	Silverness Economical Society, Ltd.	Office of the Silverness Economical Society, Ltd., Silverness	do.
*Electric Light Station	Cromer U.D.C.	Woorman & Cozens-Hardy, 82, Victoria-st., Westminster, S.W.	Jan. 12
*New Hotel and Shop	McMullend & Son, Ltd.	J. Farley, Old Cross, Hertford	do.
*Public Free Library	Ilkeston Corporation	Hunter & Woodhouse, Architects, Belper	Jan. 13
Septic Tanks, Fish Pond	Devonport Town Council	J. F. Burns, Borough Surveyor, 29, Ker-street, Devonport	Jan. 14
*Lunatic Asylum	York Asylum Visiting Committee	A. Creer, Architect, Guildhall, York	Jan. 16
Station Buildings, Wemyss Bay	Caledonian Railway Co.	J. Blackburn, 302, Buchanan-street, Glasgow	Jan. 19
Station Buildings, Inverkip	do.	do.	do.
*New Ward at Asylum, Devizes	Wilts County Pauper &c., Asylum	County Surveyor, Trowbridge	Jan. 20
*Iron Gates, &c.	Margate Corporation	E. A. Borg, Borough Surveyor, Margate	No date
Drainage Works, Carlton and Robin Hood Schools	Lofthouse (Yorks) School Board	W. E. Richardson, Architect, Rothwell, near Leeds	do.
Additions to schools, Granada	Bangor School Board	H. Hughes, Architect, Bangor	do.
Road Works, Freehfield-road, Brighton	.....	Surveyor, Craven Vane Estate, Brighton	do.
Brick Chimney	.....	Nicholas & Co., Plantation Mill, Haslingden	do.
House, Keswick	.....	H. A. Cheers, Architect, Twickenham	do.

Those marked with an asterisk (*) are advertised in this Number. *Competitions*, lv. *Contracts, pp.* lv. vi. viii. & x. *Public Appointments*, —

Leyton.—High-rd., the Lion and Key p.h., f., p., with goodwill £31,700

December 17.—By ALDRIDGE'S.

Notting Hill.—75, Clarendon-rd., u.t. 37 yrs., g.r. 12*l.* 10s., e.r. 80*l.* 395

By FOSTER & CRANFIELD.

Islington.—St. Philip-st., &c., i.g.r. 186*l.* 12s. 1d., u.t. 24½ yrs., g.r. 9*l.* 1,400

Arlington-sq., i.g.r.'s 54*l.* 12s., u.t. 24½ yrs., g.r. 18*l.* 15s. 530

Caledonian-rd.—Pembroke-st., i.g.r.'s 31*l.* 10s., u.t. 47 yrs., g.r. 3*l.* 480

Kentish Town.—Prince of Wales-rd., i.g.r.'s 59*l.* 5s., u.t., 38 yrs., g.r. 22*l.* 630

Kensington.—Douro-pl., i.g.r.'s. 36*l.*, u.t. 24½ yrs., g.r. 12*l.* 425

By HERRING, SON, & DAW.

Tooting.—127, Drakefield-rd., u.t. 86¾ yrs., g.r. 8*l.* 16s., p. 550

Hornsey Rise.—12, Trinder-rd., u.t. 73 yrs., g.r. 6*l.*, p. 385

By JONES, SON, & DAY.

Dalston.—74, Greenwood-rd., u.t. 49 yrs., g.r. 6*l.* 6s., e.r. 45*l.* 475

Forest Gate.—30 to 40 (even), Avenue-rd., f., w.r. 209*l.* 6s. 2,100

By VINCENT S. LEIGH.

Dalston.—3, Gayhurst-rd., u.t. 44 yrs., g.r. 5*l.*, e.r. 36*l.* 375

38, 40, and 42, Graham-rd., u.t. 48¾ yrs., g.r. 16*l.* 10s., y.r. 122*l.* 1,275

By REYNOLDS & EASON.

Bethnal Green.—79, Hare-st. (S), y.r. 35*l.* 520

By WAGSTAFF & SONS

Islington.—352, Gibson-sq., u.t. 24½ yrs., g.r. 2*l.*, e.r. 4 350

Highbury.—100, Grosvenor-rd., u.t. 47 yrs., g.r. 10*l.* 10s., e.r. 80*l.* £610

Forest Gate.—125, Chestnut-av., u.t. 93½ yrs., g.r. 6*l.* 15s., e.r. 52*l.* 520

By HENRY HENDRIKS (at Birmingham).

Edgbaston, Warwick.—Willow-av., a plot of building land, area 2,002 yds., f. 251

64 and 65, New John-st., u.t. 78 yrs., g.r. 27*l.* 15s., w.r. 137*l.* 16s. 700

Handsworth, Staffs.—69 and 71, St. Peter's-rd., u.t. 76 yrs., g.r. 11*l.* 16s. 3d., y.r. 80*l.* 1,010

By G. F. LOCKWOOD (at Kirkstall).

Kirkstall, Yorks.—The Airedale Carriage and Wagon Co.'s manufacturing premises, foundry, worshops, and sidings, area 2,420 yds., u.t. 24¾ yrs., g.r. 16*l.* (as a going concern) .. 2,000

December 18.—By BEALE & CAPPS.

Notting Hill.—72, 74, and 76, South-row, f., w.r. 78*l.* 700

27, 29, and 31, West-row (laundries and stabling), f., w.r. 200*l.* 8s. 1,960

1, 3, and 5, Swinbrook-rd., u.t. 63½ yrs., g.r. 21*l.*, w.r. 163*l.* 16s. 1,065

2, 3, and 4, Tavistock-mews, u.t. 42½ yrs., g.r. 12*l.* 10s., w.r. 81*l.* 12s. 355

By BISLEY & SONS.

Deptford.—26, Trundleys-rd., u.t. 64 yrs., g.r. 4*l.* 15s., w.r. 32*l.* 10s. 930

By HAWKINGS & SON.

Cavendish-square.—28 and 30, Wigmore-st. (Norfolk Mansion Hotel), u.t. 30¼ yrs., g.r. 96*l.*; the upper part of 32 and 34, Wigmore-st., u.t. 24½ yrs., y.r. 350*l.*; also 26 and 27, Wimpole-st., and upper part of 26, Wigmore-st. (Queen Anne Mansions), u.t. 16 yrs., y.r. 650*l.*, as a going concern (in one lot) 5,500

By FRAIK JOLLY & CO.

Clapton.—7, Pembury-rd., u.t. 47 yrs., g.r. 10*l.*, y.r. 60*l.* £710

By M. ROBSON.

Holloway.—9, Wray-cres., u.t. 75½ yrs., g.r. 8*l.* 10s., y.r. 45*l.* 460

By SPENCER, SANTO, & CO. (at Masons' Hall Tavern).

Acton.—18 and 26, Grafton-rd., u.t. 90*l.*, g.r. 12*l.*, y.r. 76*l.* 660

19, 23, and 27, Perryn-rd., u.t. 86 yrs., g.r. 33*l.*, y.r. 195*l.* 1,825

3, Shaa-rd., u.t. 86 yrs., g.r. 5*l.* 5s., y.r. 75*l.* .. 750

By FULLER, MOON, & FULLER (at Croydon).

Croydon.—Cross-rd., The North Pole b.-h., f., y.r. 30*l.* 670

229, White Horse-rd., f., w.r. 22*l.* 2s. 300

7 and 9, Dennett-rd., f., w.r. 42*l.* 12s. 660

Thornton Heath.—Langdale-rd., two plots of land, f. 395

Farnley-rd., a plot of land, ¼ acre, f. 145

December 19.—By G. A. WILKINSON & SON.

Kilburn.—High-rd., f.g.r.'s 70*l.*, reversion in 71 yrs. 2,250

Belsize-rd., f.g.r.'s 120*l.*, reversion in 31 yrs. .. 3,635

Belsize-rd., i.g.r.'s 63*l.*, u.t. 71 yrs., g.r. 15*l.* .. 850

Kensington.—Netherwood-rd., f.g.r.'s 178*l.* 10s., reversion in 65 yrs. 4,870

Wargrave, Berks.—High-st., f.g.r. 16*l.*, reversion in 87 yrs. 220

By FRANK & ASHTON.

Bayswater.—10, Sutherland-pl., u.t. 43¼ yrs., g.r. 12*l.*, y.r. 50*l.* 450

Fulham.—67 to 77 (odd), Wardo-av., u.t. 94 yrs., g.r. 21*l.*, w.r. 195*l.* 1,410

By R. N. STOLLERY (at Barbican Repository).

Islington.—64, High-st. (Dairy), with stabling and yard adjoining, area 29,000 ft., u.t. "99" yrs., y.r. 200*l.* £998

Contractions used in these lists.—*F.g.r.* for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns for gardens; yd. for yard; gr. for grove; b.h. for beer-house; p.h. for public-house; o. for offices; s. for shops.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 13 0	per 1,000 alongside, in river.
Rough Stocks and Grizzles	1 10 0	" " "
Facing Stocks	2 12 0	" " "
Shippers	2 5 0	" " "
Flettons	1 7 6	" at railway depôt
Red Wire Cuts	1 12 0	" " "
Best Fareham Red	3 12 0	" " "
Best Red Pressed Ruabon Facing	5 0 0	" " "
Best Blue Pressed Staffordshire	4 5 0	" " "
Do., Bullnose	4 11 0	" " "
Best Stourbridge Fire Bricks	4 8 0	" " "
GLAZED BRICKS.		
Best White and Ivory Glazed Stretchers	13 0 0	" " "
Headers	12 0 0	" " "
Quoins, Bullnose, and Flats	17 0 0	" " "
Double Stretchers	19 0 0	" " "
Double Headers	16 0 0	" " "
One Side and two Ends	19 0 0	" " "
Two Sides and one End	20 0 0	" " "
Splays, Chamfered, Squints	20 0 0	" " "
Best Dipped Salt Glazed Stretchers and Headers	12 0 0	" " "
Quoins, Bullnose, and Flats	14 0 0	" " "
Double Stretchers	15 0 0	" " "
Double Headers	14 0 0	" " "
One Side and two Ends	13 0 0	" " "
Two Sides and one End	15 0 0	" " "
Splays, Chamfered, Squints	14 0 0	" " "
Seconds Quality White and Dipped Salt Glazed	2 0 0	" less than best.
Thames and Pit Sand	7 0	per yard, delivered.
Thames Ballast	6 0	" "
Best Portland Cement	30 0	per ton, delivered.
Best Ground Blue Lias Lime	21 0	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 10*s.* 6*d.* per yard, delivered.
Stourbridge Fire-clay in sacks, 27*s.* 6*d.* per ton at rly. dpt.

STONE.

	s. d.	
Ancaster in blocks	1 11	per ft. cube, deld. rly. depot
Bath "	1 7	" "
Farleigh Down Bath	1 8	" "
Bear in blocks	1 6	" "
Grinshill "	1 10	" "
Brown Portland in blocks	2 2	" "
Darley Dale in blocks	2 4	" "
Red Corsehill "	2 5	" "
Closeburn Red Freestone	2 0	" "
Red Mansfield "	2 4	" "

YORK STONE—*Robin Hood Quality.*

Scappled random blocks 6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per foot super.
6 in. Rubbed two sides Ditto, Ditto	2 6	" "
3 in. Sawn two sides slabs (random sizes)	0 11½	" "
2 in. to 2½ in. Sawn one side slabs (random sizes)	0 7½	" "
1¼ in. to 2 in. ditto, ditto	0 6	" "
BEST HARD YORK— Scappled random blocks 6 in. sawn two sides, landings to sizes (under 40 ft. sup.)	3 0	per ft. cube "
	2 8	per ft. super. "
6 in. Rubbed two sides Ditt		" "
3 in. sawn two sides slabs (random sizes)	1 2	" "
2 in. self-faced random flags	0 5	" "
Hopton Wood (Hard Bed) in blocks	2 3	per ft. cube. deld. rly. depôt.
" " " 6 in. sawn both sides landings	2 7	per ft. super. deld. rly. depôt.
" " 3 in. do.	1 2½	" "

PRICES CURRENT (*Continued*).

SLATES.

in.	in.	£ s. d.	
20×10 best blue Bangor		13 2 6	per 1000 of 1200 at ry. dep
20×12	" " "	13 17 6	" "
20×10 best seconds	"	12 15 0	" "
20×12	" " "	13 10 0	" "
16×8 best	"	7 0 0	" "
20×10 best blue Portmadoc		12 5 0	" "
16×8 best blue Portmadoc		6 0 0	" "
20×10 best Eureka unfading green		15 0 0	" "
20×12	" "	16 10 0	" "
18×10	" "	11 10 0	" "
16×8	" "	8 7 6	" "
20×10 permanent green		20 10 0	" "
18×10	" "	9 0 0	" "
16×8	" "	6 5 0	" "

TILES.

	s. d.	
Best plain red roofing tiles	42 0	per 1,000, at rly. depôt.
Hip and valley tiles	3 7	per doz. " "
Best Broseley tiles	50 0	per 1,000 " "
Do. Ornamental tiles	52 6	" " "
Hip and valley tiles	4 0	per doz. " "
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000 " "
Do. ornamental Do.	60 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles	3	" " "
Best Red or Mottled Staffordshire Do. (Peakes)	51 0	per 1,000 " "
Do. Ornamental Do.	54 6	" " "
Hip tiles	4 1	per doz. " "
Valley tiles	3 8	" " "
Best "Rosemary" brand plain tiles	48 0	per 1,000 " "
Do. Ornamental Do.	50 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles	3 8	" " "

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.	
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	15 10 0	16 10 0	
Deals: best 3 by 9	14 10 0	15 10 0	
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 10 0	12 10 0	
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.	
Deals: seconds	1 0 0	less than best	
Battens: seconds	0 10 0	" " "	
2 in. by 4 in. and 2 in. by 6 in.	9 0 0	9 10 0	
2 in. by 4½ in. and 2 in by 5 in.	8 10 0	9 10 0	
Foreign Sawn Boards— 1 in. and 1¼ in. by 7 in.	0 10 0	more than battens.	
¾ in.	1 0 0	"	
Fir timber: Best middling Dantzig or Memel (average specification)	At per load of 50 ft. 4 10 0	5 0 0	
Seconds	4 5 0	4 10 0	
Small timber (8 in. to 10 in.)	3 12 6	3 15 0	
Small timber (6 in. to 8 in.)	3 0 0	3 10 0	
Swedish balks	2 15 0	3 0 0	
Pitch-pine timber (30 ft. average)	3 5	3 15 0	

JOINERS' WOOD. At per standard.

White Sea: First yellow deals, 3 in. by 11 in.	23 0 0	24 0 0
3 in. by 9 in.	21 0 0	22 10 0
Battens, 2½ in. and 3 in. by 7 in.	17 0 0	18 10 0
Second yellow deals, 3 in. by 11 in.	18 10 0	20 0 0
" " 3 in. by 9 in.	17 10 0	19 0 0
Battens, 2½ in. and 2 in. by 7 in.	13 10 0	14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	15 10 0	16 10 0
Battens, 2½ in. and 3 in. by 7 in.	11 10 0	12 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	21 0 0	22 10 0
Do. 3 in. by 9 in.	18 0 0	19 10 0
Battens	13 10 0	15 0 0
Second yellow deals, 3 in. by 11 in.	16 0 0	17 0 0
Do. 3 in. by 9 in.	14 10 0	16 0 0
Battens	11 10 0	12 10 0
Third yellow deals, 3 in. by 11 in.	13 10 0	14 0 0
Do. 3 in. by 9 in.	13 0 0	14 0 0
Battens	10 0 0	11 0 0
White Sea and Petersburg:— First white deals, 3 in. by 11 in.	14 10 0	15 10 0
" " 3 in. by 9 in.	12 10 0	14 10 0
Battens	11 0 0	12 0 0
Second white deals 3 in. by 11 in.	13 10 0	14 10 0
" " 3 in. by 9 in.	12 10 0	13 10 0
" " battens	9 10 0	10 10 0
Pitch-pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—First, regular sizes	33 0 0	upwards.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—Planks, per ft. cube	0 3 6	0 4 6
Dantzig and Stettin Oak Logs— Large, per ft. cube	0 2 6	0 3 6
Small " "	0 2 3	0 2 6
Wainscot Oak Logs, per ft. cube	0 5 0	0 5
Dry Wainscot Oak, per ft. sup. as inch	0 0 7	0 0 8
¾ in. do.	0 0 5½	
Dry Mahogany— Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	16 10 0	20 0 0
American Whitewood Planks— Per ft. cube	0 4 0	

PRICES CURRENT (*Continued*).

WOOD.

	Per square. £ s. d.	£ s. d.
Prepared Flooring— 1 in. by 7 in. yellow, planed and shot	0 13 6	0 17 6
1 in. by 7 in. yellow, planed and matched	0 14 0	0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	1 1 6
1 in. by 7 in. white, planed and shot	0 12 6	0 13 6
1 in. by 7 in. white, planed and matched	0 13 0	0 14 0
1¼ in. by 7 in. white, planed and matched	0 14 6	0 16 6
in. by 7 inch yellow matched and beaded or V-jointed boards	0 12 0	0 13 6
1 in. by 7 in. do. do. do.	0 14 0	0 18 0
¾ in. by 7 in. white do. do.	0 10 0	0 11 6
1 in. by 7 in. do. do. do.	0 11 6	0 13 6

6-in. at 6d. to 9d. per square less than 7-in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	6 5 0	7 5 0
Compound Girders " "	8 2 6	9 5 0
Angles, Tees and Channels, ordinary sections	7 17 6	8 17 6
Flitch Plates	8 5 0	8 15 0
Cast Iron Columns and Stanchions, including ordinary patterns	7 2 6	8 5 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON— Common Bars	7 15 0	8 5 0
Staffordshire Crown Bars, good merchant quality	8 5 0	8 15 0
Staffordshire "Marked Bars"	10 10 0	- - -
Mild Steel Bars	9 0 0	9 10 0
Hoop Iron, basis price	9 5 0	9 10 0
" " galvanised	16 0 0	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.— Ordinary sizes to 20 g.	10 0 0	- - -
" " to 24 g.	11 0 0	- - -
" " to 26 g.	12 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality— Ordinary sizes 6 ft. by 2 ft. to 3 ft. to 20 g.	12 15 0	- - -
" " 22 g. and 24 g.	13 5 0	- - -
" " 26 g.	14 5 0	- - -
Sheet Iron, Galvanised, flat, best quality:— Ordinary sizes to 20 g.	16 0 0	- - -
" " 22 g. and 24 g.	16 10 0	- - -
" " 26 g.	18 0 0	- - -
Galvanised Corrugated Sheets:— Ordinary sizes, 6 ft. to 8 ft. 20 g.	12 15 0	- - -
" " 22 g. and 24 g.	13 5 0	- - -
" " 26 g.	14 5 0	- - -
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	12 0 0	- - -
" " 22 g. and 24 g.	13 0 0	- - -
" " 26 g.	14 5 0	- - -
Cut nails, 3 in. to 6 in.	9 5 0	9 15 0
(Under 3 in. usual trade extras.)		

LEAD, &c.

	Per ton, in London. £ s. d.	£ s. d.
LEAD—Sheet, English, 3 lbs. & up.	13 5 0	- - -
Pipe in coils	13 15 0	- - -
Soil Pipe	16 5 0	- - -
Compo Pipe	16 5 0	- - -
ZINC—Sheet— Vieille Montagne	25 0 0	- - -
Silesian	24 10 0	- - -
COPPER— Strong Sheet per lb	0 0 10	- - -
Thin "	0 0 11	- - -
Copper nails "	0 0 11	- - -
BRASS— Strong Sheet "	0 0 9	- - -
Thin "	0 0 10	- - -
TIN—English Ingots "	0 1 9	- - -
SOLDER—Plumbers' "	0 0 6½	- - -
Tinmen's "	0 0 8½	- - -
Blowpipe "	0 0 9½	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
" fourths	2¾d. " "
21 oz. thirds	3¾d. " "
" fourths	4¼d. " "
26 oz. thirds	4d. " "
" fourths	3¾d. " "
32 oz. thirds	5d. " "
" fourths	4¾d. " "
Flatted sheet, 15 oz.	3d. " "
" 21 "	4d. " "
½ Hartley's Rolled Plate	1¾d. " "
¼ " " "	2d. " "
⅛ " " "	2¼d. " "

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes or barrels per gallon	0 0 4
" " " in drums "	0 0 7
Boiled " " in pipes or barrels "	0 0 5
" " " in drums "	0 0 8
Turpentine, in barrels "	0 3 3
" in drums "	0 3 5
Genuine Ground English White Lead per ton	22 0 0
Red Lead, Dry "	20 0 0
Best Linseed Oil Putty per cwt.	0 2 6
Stockholm Tar per barrel	1 12 0

[*See also next page.*

PRICES CURRENT (*Continued*).

VARNISHES, &c.	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 6
Superfine Hard-drying Oak, for Seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Rippoline Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 8 0
Brunswick Black	0 3 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

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* Denotes *accepted*. † Denotes *provisionally accepted*.

BRIGHTON.—For new telephone room at the Royal Pavilion, for the Corporation of Brighton. Mr. Francis J. C. May, F.S.I., M.Inst.C.E., Borough Engineer and Surveyor:—

Longley & Co.	£1,149	Payne, Norman & Co.*	£984
Sutton & Evershed	1,084	Field & Co., Brighton*	930
Box & Turner	1,057	A. Crowhurst	907

HARROW-ON-THE-HILL.—For the erection of the new Magistrates' Courts at Greenhill, Harrow, for the Middlesex County Council. Mr. H. T. Wakelam, County Architect:—

R. L. Tonge, Watford £6,050

LONDON.—For heating and hot-water supplies to the old pavilions at Plaistow Fever Hospital. Mr. Edwin T. Hall, architect, 34, Bedford-square, W.C.:—

Dargue, Griffiths, & Co.	£2,480 3 6
J. King, Ltd.	1,441 10 0
Troup, Curtis, & Co.	1,037 0 0
R. A. Crowe	1,000 0 0
Korting Bros.	1,220 0 0
Crittall & Co.	1,173 17 6
Werner, Pfleiderer, & Perkins	1,150 0 0
Wood & Sons	1,140 10 0
Simpson & Co.	1,135 0 0
J. & F. May	1,120 0 0
Dawson & Co.	1,095 0 0
West Ham Works Department	1,082 0 0
J. Metcalf	1,064 15 0
Potter & Sons	987 0 0
Moorwood, Sons, & Co.	980 0 0
Herring & Son	975 0 0
Mather & Platt	934 4 0
Wenham & Waters	892 0 0
Lancashire Heating Co.	825 0 0
Brightside Foundry Co.	810 0 0

SOUTHAMPTON.—For the erection of a fire-escape staircase at the workhouse, St. Mary's-street, for the Southampton Board of Guardians. Messrs. Youngs & Thomas, architects, 74, Above Bar, Southampton:—

Jenkins & Sons	£117 0 0	T. Williams	£81 15 0
Sanley & Co.	102 0 0	Herring & Son	75 10 6
Lancaster & Son	91 13 2	F. & J. Young, Southampton*	74 10 0
Hayward Bros. & Eckstein	89 10 0	Wood & Co.	69 17 0
St. Pancras Iron-work Co.	85 2 6	Lion Foundry, Kirkintilloch	63 15 0
Dowdall & Son	84 0 0		

WILLESDEN.—For the erection of a new assembly-hall, physical and chemical laboratories, &c., at the Polytechnic (Technical Institute), Willesden, for the Middlesex County Council. Mr. H. T. Wakelam, County Architect:—

Chambers Bros., Ealing £3,203

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